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29 May 1981

Worldwide Report

ENVIRONMENTAL QUALITY

No. 307

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GOVERNMENTS SIGN PACT ON SILTATION PROBLEMS

Manila PHILIPPINES DAILY EXPRESS in English 26 Apr 81 p 14

[Article by German Lim]

[Text]

THE Philippines and the Japanese governments have signed a joint agreement calling for the immediate study on the siltation problems in six major ports of entry in the country today.

The agreement was signed by Highways Deputy Minister Oscar Rodriguez for the government and Felipe F. Cruz Sr., president of the F.F. Cruz & Co. and representatives of the Pacific Consultants International Inc., partners in consulting services.

Under the agreement, the consulting firm will undertake the study of the siltation problems in the ports of Batangas, Tacloban, Iloilo, Pulupandan, Cebu and Davao. These ports are currently suffering from heavy siltation problems resulting in imminent danger to international and domestic shipping.

A survey team, of the Overseas Economic Cooperation Fund (OECF) of Japan, which undertook survey confirmed the heavy siltation in the country's major ports rendering them ineffective.

* * *

RODRIGUEZ said that the study will determine the hydraulic phenomenon causing the siltation, determine the rate of siltation and the effects on the sedimentation rate of putting up training works on these ports.

The OECF granted a credit loan under the 6th and 7th Yen loan package, amounting to approximately $38.1 million. The funds will be used for the purchase of dredging equipment.

Originally studied by the Philippines Ports Authority in 1979, the port authority which took over the management and operations of all ports, found out that practically all major ports in the country were heavily silted. One such port is the port of Manila. However, the public works ministry constantly dredged the Manila South and North harbors.

Rodriguez pointed out that the siltation problems in most major ports have reached alarming proportions.

THE documents signed will now be forwarded to the head office of OECF in Tokyo and the contract review committee of the Natonal Economic and Development Authority for approval.

Rodriguez who is in charge of all loan negotiations with the Japanese government said that the agreement will redound to the improvement of ports operations in the country.

It will be recalled that only very few of these ports have been dredged since they were constructed. The result was the accummulation of silt debris and eventual isolation of the port from both local and ocean-going vessels.

CSO: 5000

ASEAN ADOPTS DECLARATION ON ENVIRONMENT

Manila PHILIPPINES DAILY EXPRESS in English 1 May 81 pp 1, 6

[Text]

THE FIRST LADY, Imelda R. Marcos, urged yesterday a reexamination of the effects of technology on the environment to protect natural processes that are crucial to man's survival.

Addressing the First Environmental Meeting of the Association of Southeast Asian Nations, the First Lady pointed out that although technology has touched people's lives in positive ways, it could also be destructive.

The First Lady, who is also the Philippines' human settlements minister, was elected chairman of the one-day conference attended by ASEAN environmental ministers. The conference was held at the Philippine Plaza.

Under her leadership, the conferees unanimously adopted a Manila Declaration on the ASEAN Environment which seeks, among others, the protection of the environment in the region.

• • •

THE DECLARATION called attention to the need to safeguard the ASEAN environment and natural resources to make them available for a sustained economic development.

The agreement's ultimate aim is to eradicate poverty and attain the highest possible quality of life for the people of the ASEAN countries by preventing the destruction of the natural resources that will provide them with the means to achieve material progress over the long haul.

• • •

TO ACHIEVE the goal, the ASEAN states agreed to take the following steps:

- Foster a common awareness among the peoples of the ASEAN—the biological, physical and social environment and its vital significance for sustained development to proceed apace.
- Ensure, as far as practicable, that environmental considerations are taken into account in efforts, both ongoing and future.
- Encourage the enactment and enforcement of environmental protective measures in the ASEAN countries;
- Foster the development of environmental education programs.

• • •

MEANWHILE, the Philippines urged yesterday the United Nations Center for Human Settlements to act on the proposal for the establishment of an Asian Housing Bank to finance low-cost housing in the Asia-Pacific region.

The appeal was made in response to a report made by an *ad hoc* group of experts saying that development financing institutions or development banks should be fully tapped to mobilize additional resources for human settlements projects.

• • •

IN ITS position paper, the Philippine delegation to the fourth session of the UNCHS said that the establishment of the bank will contribute to the success of human settlements programs in the region.

Once established, the Asian Housing Bank will act as a catalyst for generating funds from concessionary sources for housing for low-income families.

It will likewise serve as a direct financial participant in human settlements programs and an intermediary for mobilizing funds from conventional capital market sources which may not be directly accessible to individual country borrowers.

CSO: 5000

PEOPLE'S REPUBLIC OF CHINA

BRIEFS

JIANGSU ENVIRONMENTAL PROTECTION--The Jiangsu provincial conference on environmental protection was held in Suzhou Municipality from 28 April to 3 May. The conference approved 1980 achievements in environmental protection and called for still greater efforts to solve the pollution problems which still remain very serious at present. A speech was delivered by Liu Lin, Standing Committee member of the provincial party committee and vice governor of Jiangsu. It was decided at the conference that in the course of economic readjustment, efforts should be made in 1981 to step up environmental protection in all fields and give priority to the solution of some serious pollution problems. The conference also called for further improvement of environmental protection departments ideologically, professionally and organizationally. [Nanjing Jiangsu Provincial Service in Mandarin 1100 GMT 5 May 81 OW]

HUNAN ENVIRONMENTAL PROTECTION--The Hunan Provincial CCP Committee's Propaganda Department, the provincial science association and the provincial environmental protection office on 21 April jointly sponsored a report meeting on environmental protection. Professor (Wei Bai) of the Southeast China Mining Institute presented a report at the meeting on environmental protection at home and abroad. The meeting was attended by more than 100 leading comrades of the provincial CCP committee, the provincial people's congress, the provincial people's government and of various provincial departments, commissions and offices. [Changsha Hunan Provincial Service in Mandarin 2315 GMT 21 Apr 81 OW]

ENVIRONMENTAL PROTECTION CONFERENCE--The conference pointed out that in some localities pollution has not yet been brought under control and environmental pollution has even worsened. The representatives to the conference expressed the wish that the party committees and governments at various levels would strengthen leadership over environmental protection, establish and perfect environmental protection agencies and intensify effort to control pollution. Fu Yutian, secretary of the provincial CCP committee and vice governor of Anhui Province, addressed the conference. He urged the representatives to implement the State Council decision on environmental protection. Attending the conference were responsible comrades of the various provincial departments and environmental protection departments as well as scientific personnel on pollution control. [Nanchang Jiangxi Provincial Service in Mandarin 1100 GMT 30 Apr 81 OW]

JILIN AIR POLLUTION--Changchun, 4 May (XINHUA)--Organs under the Jilin Provincial CCP Committee, the provincial people's government, the Changchun Municipal CCP Committee and the Changchun Municipal People's Government in Jilin Province were fined on the basis of the state environment protection law promulgated in September 1979, for using improper air-polluting heating stoves. Also fined were Chunyi Guest House, the No 5 Branch of the Changchun Department Store, the Changchun Film Distribution Company, the bath house of the Jilin Military District, the Jilin Provincial Foreign Trade Bureau, the Jilin Provincial Science and Technology Information Center and seven units under a certain PLA unit. [XINHUA Domestic Service in Chinese 0100 GMT 4 May 81 OW]

URBAN POLLUTION CONTROL--Tianjin's Tanggu ward has closely integrated environmental protection with energy conservation, attaining obvious success in the elimination of pollution. By the end of last year, 90 percent of the region's boilers and 50 percent of the industrial kilns had been revitalized. While smoke and dust pollution was reduced by 79 percent, the average heating efficiency of the boilers was at the same time improved by 14 percent, a yearly saving of nearly 20,000 tons of coal. Nineteen factories implemented 29 projects to control the "three wastes;" they can handle 1.2 million tons of toxic wastewater per year, 4 million cubic meters of harmful waste gases, and 1.6 million tons of waste residue, recovering large quantities of useful materials. The Tanggu region borders the Bohai sea and is one of our bases for the marine chemical industry. Drainage of the "three wastes" and environmental pollution were extremely serious, because none of the factories or enterprises had taken environmental protection measures. The Tanggu Regional Committee and the people's regional government, at the same time as they were implementing national and local laws and regulations regarding environmental protection, heartily grasped the work of controlling pollution in order to build civilized, clean, and beautiful new satellite towns. They organized professional contingents to adopt technological measures to remake the boilers, install dust eliminators, and popularize mechanical coal burning and regional heat supply; to raise the number of boilers with mechanical burners from 15 percent in 1973 to 58 percent; and not only to improve labor conditions for the stokers working in smoke, but also to improve the heating efficiency of "tiger coal." At present, the majority of chimneys throughout the region have had dust eliminators installed, and black smoke no longer boils out of them. Last year, 14 municipally managed enterprises in Tanggu Ward and central units in Tianjin completed 17 fairly large projects to control the "three wastes," obviously decreasing atmospheric and environmental pollution. In the past, the Dagu Chemical Plant had released harmful chloroethylene gases into the atmosphere daily. There were numerous suggestions from the workers at the plant and residents in the vicinity, and last year the plant implemented seven projects to recover chloroethylene tail gas. Within 1 year, various chemical materials valued at more than 740,000 yuan are able to be recovered. [Text] [Tianjin TIANJIN RIBAO in Chinese 10 Mar 81 p 2] 9795

INSPECTION TOUR OF ENTERPRISES--The Standing Committee of Hongqiao Ward organized 24 representatives from all walks of life into four groups, led by the deputy chairman of the Standing Committee, the ward chief, and the deputy ward chief, to inspect environmental protection work in 16 enterprises. During the tour, the representatives saw the relatively good results achieved by using film and spray drying equipment to control dyestuff dust at the No 6 Chemical Dye Plant; at the Dongfeng Chemical Plant, last year alone over 133,000 yuan in lead and cadmium were recovered from liquid waste; results also were achieved in controlling the sulfur wastewater in metabolic liquids and in purifying the electroplating wastewater at an electrical control equipment plant and at the No 6 Automotive Transport Yard. The representatives gave high appreciation and encouragement to the aforementioned units. They issued harsh criticism and demanded controls for those units that severely pollute the environment and damage the ecology. During the tour, the representatives gave particular attention to the dissemination of "Huanbaofa" ["Environmental Protection Methods"], and they continually introduced the experiences of vanguard units and stressed the significance of protecting the environment. They assisted the leadership of lagging units in raising the consciousness and rectifying the relationship between production and the control of the "three wastes," while urging and supervising them in implementing positive controls. [Text] [Tianjin TIANJIN RIBAO in Chinese 10 Mar 81 p 2] 9795

NEW ENVIRONMENTAL PROTECTION EQUIPMENT--Tianjin's No 3 Analysis Instruments Plant has provided new equipment for the cause of environmental protection. The atmospheric sulfur dioxide monitor which they painstakingly designed and manufactured was among the most successful at a national conference convened at the end of last year to evaluate test equipment of this type. This product serves the cause of environmental protection, which has developed in recent years. It is primarily for use in carrying out air pollution tests in the general atmospheric environment and in areas of relatively high sulfur content. Through numerically accurate records and the obvious level of sulfur density in the atmosphere, it can facilitate the immediate adoption of measures to protect the health of the people and the preservation of living things. Last year alone, they mass-produced 50 sets and, by paying heed to users' opinions, continually improved the product and increased its quality. During the national evaluation of similar products, with the unanimous confirmation of the conference delegates as to the simple structure, advanced technology, and superior modeling of the product, as well as the stabilization of characteristics in the continuing work, the fine reemergence, and the confirmed recovery rate of as much as 99.1 percent, the product was recognized as being of a fairly high level for our present environmental protection cause. [Text] [Tianjin TIANJIN RIBAO in Chinese 10 Mar 81 p 2] 9795

CSO: 5000/4056

TIMBER SHORTAGE PREDICTED UNLESS CONSERVATION MEASURES ACCELERATED

Manila PHILIPPINES DAILY EXPRESS in English 18 Apr 81 p 3

[Article by Michael A. Bengwayan]

[Text] In a country long noted for vast forest resources, a timber shortage would seem unthinkable.

But that's what has been predicted for the Philippines by the year 2000, unless slash and burn farming and forest fires are checked effectively and reforestation rate is accelerated.

The prediction comes from the Population, Resources, Environment and Philippine Future, an agency consortium of the University of the Philippines School of Economics, the UP Population Institute and Development Academy of the Philippines.

PREPF's interpretation of the 1976 Landsat photographs indicates that only 9 million hectares or 27 percent of the country's total land area are densely stocked with lush forest growth.

The National Economic Development Authority had launched a five-year program under which an estimated six million hectares are to be reforested by the year 2000. But PREPF found that current land use policies, forest protection and lax enforcement of forest rules on logging were upsetting the reforestation timetable.

At most, only 4.7 million hectares could be reforested by the end of this century, PREPF estimated.

And even assuming the target, six million hectares could be fully reforested by the year 2000, PREPF said, only 13.6 million cubic meters of logs could be harvested from these man-made forests annually.

To sustain the growing domestic demand for timber products and part of the foreign demand for Philippine wood products, natural forests would eventually have to be tapped, according to the agency. And no man-made forests would be able to replace these logged-over natural forests in a short time.

PREPF thus recommended stricter government regulation of Philippine woods exports, if only to save part of the available timber for domestic uses in the long haul.

The agency also suggested that government should:
--Increase the target area for reforestation from six million to 12 million hectares.
--Strictly enforce logging rules to cover all logging concessions.
--Reformulate the allowable volume of timber to be cut annually.
--Reverse marginally cultivated and cogon lands into forest range land.

Aware of the grim prospects for Philippine forests, a number of government forest development planners visited China to observe that country's reforestation methods.

As a result of such visits, government launched forest conservation programs notably:

--The Program for Forest Ecosystem Management which calls for the planting of trees on all idle landsites, including roadsides, parks and farms with potential of being turned into tree farms.

--The family approach to kaingin movement, which met with initial success in the Mountain Provinces. It involves replanting of abandoned swidden (kaingin) plots by those farming other plots nearby. Farmers are paid in installments, depending on the rate of seedling survival.

These and other programs represent government attempts to apply technology and research to forest conservation. But more will be needed, said PREPF. Foremost is public support so that the country's "disappearing" forests become a national concern. --DEPTHnews

CSO: 5000

OECD ISSUES REPORT ON NEW ZEALAND ENVIRONMENTAL POLICIES

Summary of Conclusions

Wellington THE EVENING POST in English 1 Apr 81 p 26

[Text]

The Organisation for Economic Co-operation and Development, the Paris based so-called "rich nations club," has published an 80-page review of New Zealand's environmental policies.

It is only the third time that the OECD, a grouping of 24 Western industrial nations, has conducted an environmental review of a member nation. Reviews of Sweden and Japan were carried out in 1977.

An OECD team of experts visited New Zealand in 1980 to talk with Government and private bodies involved in environmental issues.

The report deals with the institutional framework for environmental management, town and country planning, agriculture and forestry, water and energy.

"New Zealand has one of the least polluted and least congested environments in the OECD group of countries," the report says in its opening introduction. "Over 18 percent of its total area is reserved in public ownership in national or forest parks. Only about 0.5 percent of its annual water yield is used for consumptive purposes, and almost 75 percent of its electricity is supplied by hydropower, one of the cleanest renewable sources of energy."

The report says New Zealand is an economically advanced country with a per capita income higher than that of the United Kingdom.

The report said that New Zealand is expanding its industrial and agricultural base, and this could add pressure to existing conservation and pollution control problems. In a time of persistent inflation and balance of payments deficit the costs of environmental protection can be harder to absorb.

"On the other hand, it must be recognised in New Zealand and elsewhere that sound environmental management can be an employment-creator and that the costs imposed by a failure to manage the environment prudently can be very great indeed."

Some of the conclusions in the report are:

☐ The Government should establish a ministry for the environment.

☐ New Zealand's controversial Mining act needs amending.

☐ The amount of lead permitted in petrol should be reduced and it is desirable that maximum permitted levels of carbon monoxide and hydrocarbon emissions be set.

☐ Noise control laws should be strengthened and centralised.

☐ Wilderness areas of native forest should be established with minimum public access available.

☐ The use of the herbicide 2,4,5-T should be restricted.

☐ Measures should be taken to reserve chemically and biologically safe waters for future needs.

☐ Urgent attention should be given to legislation to protect wild and scenic rivers.

☐ The National Development Act has considerable merit.

Pressure on Government

Wellington THE EVENING POST in English 7 Apr 81 p 2

[Article by political correspondent Tony Garnier in the column "Weekwatch"]

[Text]

WITH the election now less than eight months away, an important OECD report detailing New Zealand's need for stronger environmental policies has surfaced at a difficult time for the Government.

Using a megaphone and standing on a soap box, the Minister for the Environment, Dr Ian Shearer, launched the controversial document in Wellington's Civic Square last week.

He urged the public to read the document carefully and send any comments to him.

While open government is to be widely applauded, it was a strange form of launching. A more conservative and cautious minister would have been pleased to see this kind of document pigeonholed as quickly as possible — especially in an election year.

Other ministers might have wanted cabinet to act quickly on the report's major recommendations before political opponents could exploit it and before more steps are taken to implement the so-called "think big" development strategy.

The recommendations call for major institutional changes, including setting up a high-powered environment ministry and an independent group to audit projects.

In essence, the document highlights the potential of the "think big" projects to do enormous damage to New Zealand's unique environment. It makes the basic point that large-scale industrialisation elsewhere has always been followed by significant pollution and environmental problems.

About 10 years ago, the publication of Rachel Carson's "Silent Spring" first began to touch many governments' dormant sensibilities about the considerable damage that industrialisation was doing to the environment. Some massive projects to clean up industrial estates, rivers and the atmosphere were launched around the world in the 1970s.

The OECD's underlying message to New Zealand is plain enough. The "think big" strategy will not be worth the effort and cost if a unique environment of plants and animals, including human beings, becomes polluted, threatened and even endangered as has happened elsewhere with similar large-scale projects.

There were certain steps that, given the right political will, could be taken to ensure greater protection to the environment.

Yet there may be political comment upon Dr Shearer's decision to unveil the OECD report in a public arena and not to immediately approach cabinet.

As a new minister, he is unlikely to be immediately successful at getting major institutional changes approved. Anyway, this year's legislative programme is already filling up.

Also, in purely vote-catching terms, there is little sign that the "think big" strategy has captured the public's imagination.

On the other hand, the environmentalist lobby is particularly strong. In the 1970s, for example, public concern for native forest preservation was reflected in a petition signed by 341,000 New Zealanders — more than 10 percent of the population — calling for protection of native forests and reduction of logging.

The Government's initial response was to dismiss the petition. But for the sustained intervention of Dr Shearer while he was still a backbencher, the issue would have probably become a major election campaign issue this year. It would have recalled the proposal in the early 1970s to raise the level of Lake Manapouri, an issue that decisively helped unseat National in 1972.

At every Government caucus meeting for nearly two months in late 1979, Dr Shearer would march to the front, pin a map of forest lands on the wall and strongly argue for a moratorium to stop native logging.

Eventually the cabinet began to listen. A compromise Maruia Declaration was announced early last year, largely excluding clear felling from state forests in favour of selective logging.

Could he do the same again, this time in cabinet? It will depend, Dr Shearer freely agrees, on the public's response to the OECD document. He envisages gauging the public's reaction over the next month and then setting a timetable for action.

Meanwhile, the authoritative nature of the OECD report makes it plain that the cabinet will need to be wary in the way it proceeds with the "think big" strategy.

It would be foolish to ignore the "environmentalists" — a term too often intended as a scathing dismissal of idealists so warped as to place the happiness of people above the quantifiable interests of the economy.

The "think big" projects are, of course, already in various stages of planning. They include such energy projects as refinery expansion, methanol, synthetic gasoline and ammonia-urea manufacture, and the development of energy-intensive industries such as steelworks, aluminium smelters and many pulp and paper mills.

If realised, they will turn New Zealand from a predominantly agricultural nation to one with a significant industrial base. They will provide thousands of new jobs and much-needed foreign-exchange earnings. They will also pose some tricky choices for environment and resource management and create problems for pollution prevention and control.

The Commission for the Environment has already reportedly upset some members of cabinet by publicly identifying some common issues that will touch each and every development:

- The advantage of bringing environmental factors into the early stage of project design and sustaining a concern through construction and operation.
- The potential to avoid "dirty" industrial development by adopting the significant advances in technology developed elsewhere largely in response to greater public awareness of crucial environmental issues. This option would rely not just on technology but also management and operating prac-

tions and would be worth it even if sometimes increasing the initial cost.

- All the major projects will have an impact on the same key areas of the environment: energy resources, water, air quality and noise, land use and landscape, availability and distribution of employment.
- The larger the project, the greater the potential to harm a local environment and community and for the economic and other benefits to be enjoyed by others not having to suffer from the immediate impact of the project.

In general, the OECD has backed the commission's judgment in raising these broad issues.

In particular, it has drawn attention to the possibility of New Zealand pursuing a "think big" strategy and still ensuring a quality environment by learning and applying new technology developed from the mistakes and even disasters suffered by other nations.

This is the real challenge now facing the Government: to quickly make the institutional changes that will ensure "think big" is not a huge environmental disaster and to go out of its way to apply the most up-to-date, pollution-free technology and management methods.

A "think big" strategy without more pollution would be a world first.

On one point at least the OECD is correct, we don't have to settle for second best.

Commissioner's Comment

Auckland THE NEW ZEALAND HERALD in English 11 Apr 81 p 12

[Text]

Wellington Bureau

The commissioner for the environment, Mr K. W. Piddington, believes the commission would be less effective if it were given wide-ranging powers over proposed industrial developments.

Mr Piddington said yesterday that he favoured passing legislation which would give the commission a statutory role.

It would clearly assist the commission's staff to carry out their duties, particularly by confirming their authority to appear and give evidence at legal hearings.

But to equip the commission with powers to enforce its judgment over individual projects would be a retrograde step, said Mr Piddington.

"I think as soon as you have regulations or controls to administer you are in a less effective position to give advice or float alternatives for consideration by the public," he said.

Assessment

"There is already a whole raft of people, tribunals, catchment authorities and the like who have to make decisions in the light of what we have said on whether to grant consents or impose conditions.

"I think the power of the commission is in having no power — but the independence to produce a public assessment of the environmental impact of a given project."

Mr Piddington said he welcomed a recent review of environmental policies in New Zealand by the Organisation for Economic Co-operation and Development.

"I see New Zealand moving, in response to the OECD document, towards a much more sophisticated form of environmental management," he said.

"It would not need to be over-regulated but to rest on people's knowledge and environmental conscience."

The OECD investigators who compiled the report had been amazed at the degree of participation in environmental procedures and at the public grasp of technical detail.

Mr Piddington said a small ministry of the environment, as suggested by the OECD report, could be a useful and influential body.

No organisation should be established, however, which would develop into a large and unwieldy bureaucracy.

Too Complex

Such bureaucracies, which already existed in Wellington and other capitals around the world, were prone to become too complex and to lose sight of their main function of serving the public.

The Minister for the Environment, Dr Shearer, said last week that he supported the idea of new legislation covering the commission. But he said it was unlikely to come before Parliament this year.

CSO: 5000

ENVIRONMENTAL COUNCIL WELCOMES OECD POLICY REVIEW

Wellington THE EVENING POST in English 23 Apr 81 p 8

[Text]

The Organisation for Economic Co-operation and Development's review of New Zealand environmental policies has been welcomed by the Environmental Council.

The review underlined some of the concerns that still bothered the council, the council's chairman, Mr D A Thom, said.

The Minister for the Environment, Dr Shearer, had asked the council to receive and assess public submissions on the OECD report, and a public notice would be issued shortly on the arrangements for the receipt of such submissions, Mr Thom said.

"The council considers that the time has come for a comprehensive look at the institutional arrangements for environmental management, in view of the changing emphasis," he added.

CSO: 5000

ENVIRONMENTAL GROUP SEEKS STRONGER RIVER PROTECTIONS

Auckland THE NEW ZEALAND HERALD in English 10 Apr 81 p 14

[Text]

Legislation being drafted to protect wild and scenic rivers will not give adequate protection, says the executive officer of the Environmental Defence Society, Mr Gary Taylor.

The society welcomed the Government intention to provide legislation, Mr Taylor said.

The draft legislation might be appropriate for locally important rivers, he said, but rivers of national importance for their wildlife, scenic and recreational values needed more permanent protection.

A proposed amendment to the Water and Soil Act would protect rivers under a water allocation plan.

"But this plan causes us to doubt that the Government is truly committed to a meaningful protection policy," said Mr Taylor.

Assurance

"Although we may zone land for scenic protection, an area of exceptional value is normally designated a reserve — and that provides a much greater assurance of protection."

The society was concerned that the Government was apparently ignoring a draft amendment, produced after long consultations between departments, which would provide more realistic and effective protection.

The amendment, drafted by the Queen Elizabeth II National Trust, would provide a protection order preventing any development that was incompatible with preserving a river's scenic, wildlife or recreational value, said Mr Taylor.

Elaborate

An elaborate process would be required to revoke a protection order, including a further order-in-council, the tabling of the order in Parliament for debate, and a public hearing before the Planning Tribunal.

The Environmental Defence Society would like to see minor changes to the National Trust draft, preferring the Minister of Works and Development and the Minister for the Environment to act jointly in recommending an order-in-council.

But the society considers that only if the protection order amendment is included will legislation give effective protection for rivers.

CSO: 5000

OPPOSITION LEADER URGES PROTECTION OF RIVERS

Separate Law Needed

Christchurch THE PRESS in English 10 Apr 81 p 7

[Text] PA Wellington

Urgent separate legislation is needed to protect particularly scenic and recreational rivers in New Zealand according to the Labour Party's Shadow Minister for the Environment, Mr M. K. Moore.

Mr Moore said that Government plans to amend the Water and Soil Conservation Act to protect wild and scenic rivers were "obviously yet another fob-off in the environmental protection area."

"What is needed is immediate separate legislation to protect certain rivers by the use of a national park-type status for the protection for all time of these natural treasures," he said.

The need was urgent because plans to sell electricity to the proposed Aramoana aluminium smelter would bring forward New Zealand energy needs by 20 years, he said.

Government plans to allow river protection through water allocation plans decided by regional water boards would overtax boards both for finance and staff, Mr Moore said.

Additional Report

Christchurch THE PRESS in English 10 Apr 81 p 22

[Text] The greatest danger associated with the proposed Aramoana aluminium smelter would be the need to dam the small wild creeks and rivers of New Zealand, the Labour Party Shadow Minister for the Environment (Mr M. K. Moore) said said.

Mr Moore was commenting on an article in "The Press" yesterday on an interim report by Mr C. J. R. Robertson, of the Internal Affairs Department's Wildlife Service, which said that the proposed smelter would not harm the albatross colony at Taiaroa Head.

Mr Moore said that it was conceivable that "we could get away with" the present site. But the smelter might mean that big power projects had to be brought on stream earlier than planned. That was where the danger to wildlife lay.

The smelter would take "a big chunk" of New Zealand's power, and Mr Moore said the Labour Party was concerned about the environmental impact on rivers if power projects had to be brought forward by 10 or 20 years.

Bringing projects forward meant that New Zealand might miss the technological advances that could solve its problems. Future governments might be forced to investigate the possibility of nuclear power, which the Labour Party opposed, to provide enough electricity.

Mr Moore said that the Wildlife Service had done an outstanding job in the past, and Mr Robertson might be correct in saying that the smelter would not harm the albatross colony at Taiaroa Heads. However, he would like to see a survey on the effects of the smelter on rivers and creeks, which might have to be dammed later.

"You can get a smelter anywhere in the world, but you cannot get our beautiful rivers and creeks anywhere in the world," he said.

The smelter did not only affect Dunedin, Mr Moore said. It affected people in every part of New Zealand through their power bills, and it also affected fishermen, boat and canoe clubs, and other groups who had a vested interest in South Island rivers and creeks.

"The Wildlife Service should not only examine the smelter, but the whole of New Zealand," he said.

CSO: 5000

CAMPAIGN LAUNCHED TO PRESERVE VIRGIN NATIVE FORESTS

Wellington THE EVENING POST in English 21 Apr 81 p 21

/Text/

WESTPORT, April 20 (PA). — The Native Forest Action Council and the Royal Forest and Bird Protection Society are launching a nation-wide election year campaign to preserve virgin native forests.

In a joint resolution passed at their annual conference in Westport this weekend the conservationists decided to press for legal protection of outstanding virgin forests on the West Coast and in the North Island.

The campaign will be launched at Taupo over Queens Birthday weekend and representatives of the main political parties will be invited to speak.

The conference also supported a merger between the NFAC and the RFBPS. This will be finally decided at a society meeting in June.

The national president of the NFAC, Gwenniler Davis, was re-elected unopposed. The secretary, Lindy Harwood, and national treasurer, Paddy Holland, were also re-elected. The remainder of the national executive is elected at branch level.

CSO: 5000

TWO FOREST PROTECTION GROUPS CONSIDERING MERGER

Differences Over Policy

Wellington THE EVENING POST in English 4 May 81 p 36

[Text]

A MAJOR shakeup of New Zealand's forestry conservation movement is expected this year with steps being taken to amalgamate the Native Forests Action Council and the Royal Forest and Bird Protection Society.

The initiative has come from the small highly active and financially strong NFAC and is now being given serious consideration by the comparitively large but financially troubled RFBPS.

Senior representatives of both groups were not prepared to comment publicly on the issue when contacted today.

As circulars, setting out the issue, are about to be sent out to all RFBPS members shortly, they felt it was not appropriate to comment publicly at this stage.

However, it is understood the main objective is to avoid situations, which have occurred in the past, where the two organisations have been at variance over forest policy.

For example, at one stage the RFBPS supported Forest Service proposals for logging Whirinaki State Forest and the NFAC supported the National Parks Authority's call for the forest to be included in the Urewera National Park.

One source spoken to today said that the division hindered the conservation movement at a crucial stage and, because of that, it eventually lost the battle and the forest was now being logged.

He said that although the RFBPS changed its stance the damage was done and if the two bodies were merged major differences could be avoided.

While the RFBPS has a claimed financial membership of 32,000 it is reported to be in financial trouble, facing an operating deficit of about $70,000 this year.

It is faced with either having to lay off some of its five full-time staff or increasing subscriptions.

The NFAC on the other hand, with a membership of between 5000 and 6000, has been able to raise large sums of money through sales of Christmas cards, calendars and T-shirts.

The NFAC sees the merger as an opportunity to increase its ready market for these goods and to consequently raise more money for conservation campaigning.

The NFAC merger proposal also involves a reduction in staff.

It has already laid off two of its own staff and it is understood that in accepting the merger the RFBPS will have to arrange for the early retirement of two of their full-timers.

Other proposals in the amalgamation are:—

- For the RFBPS magazine, which is aimed at the amateur naturalist, to be replaced with the new NFAC publication which is more active on major conservation issues.
- For the assets of the NFAC and publishing rights of its publications to be transferred to the RFBPS.
- For each branch or group of branches of the new merged body to form a national issues committee to concentrate on special issues.
- It is suggested that the RFBPS name be adopted for the merged organisations.

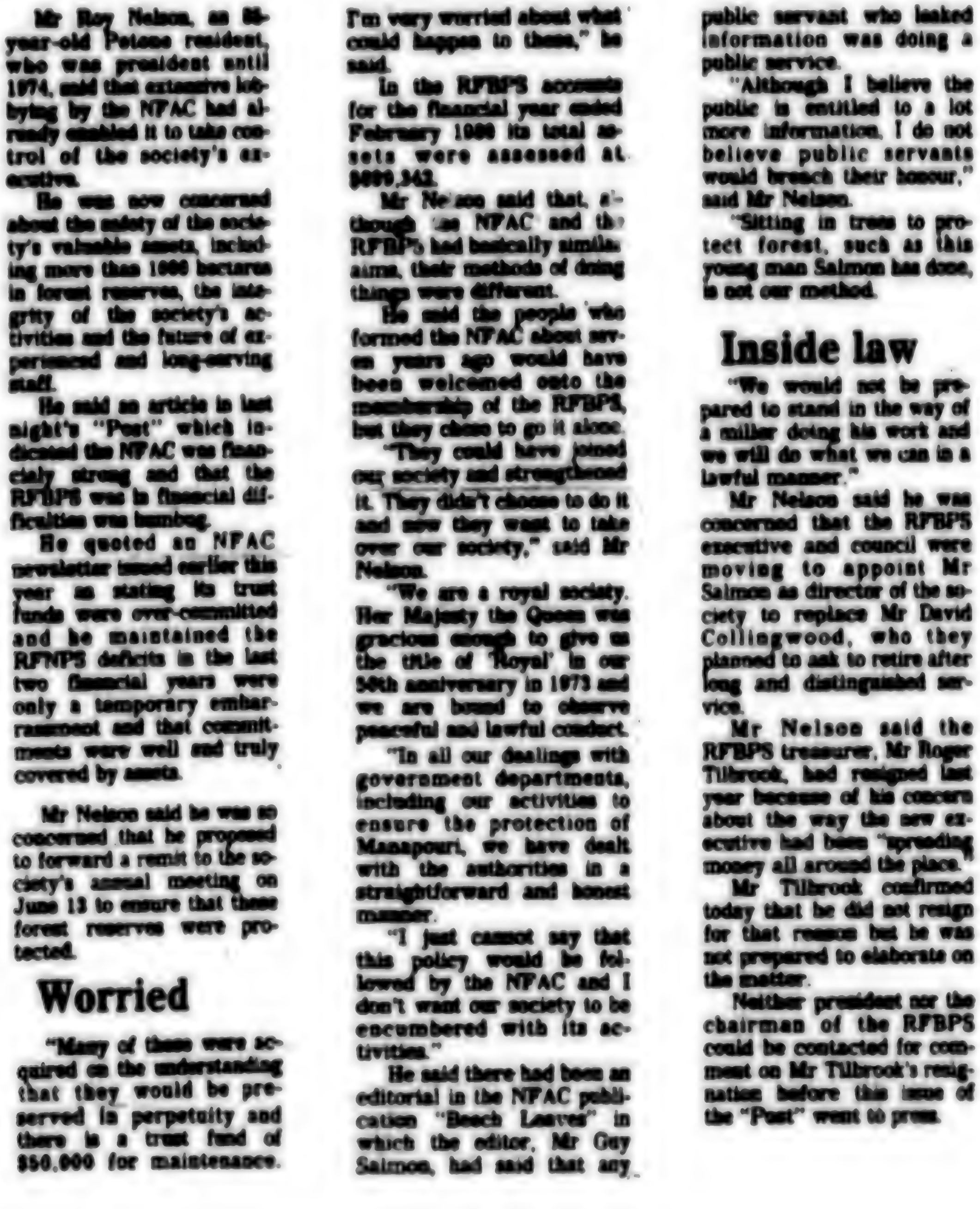
The amalgamation plan has already been accepted by the RFBPS executive, NFAC branch meetings and by a joint conference at Easter.

The final decision will be made at a special meeting of the RFBPS on June 13.

Opposition to 'Takeover'

Wellington THE EVENING POST in English 5 May 81 p 40

[Text] Grave concern at the plans of the Native Forest Action Campaign [as published] to "take over" the Royal Forest and Bird Protection Society, has been expressed by a man who was the society's president for 19 years.



Mr Roy Nelson, an 85-year-old Petone resident, who was president until 1974, said that extensive lobbying by the NFAC had already enabled it to take control of the society's executive.

He was now concerned about the safety of the society's valuable assets, including more than 1000 hectares in forest reserves, the integrity of the society's activities and the future of experienced and long-serving staff.

He said an article in last night's "Post" which indicated the NFAC was financialy strong and that the RFBPS was in financial difficulties was humbug.

He quoted an NFAC newsletter issued earlier this year as stating its trust funds were over-committed and he maintained the RFNPS deficits in the last two financial years were only a temporary embarrassment and that commitments were well and truly covered by assets.

Mr Nelson said he was so concerned that he proposed to forward a remit to the society's annual meeting on June 13 to ensure that these forest reserves were protected.

Worried

"Many of these were acquired on the understanding that they would be preserved in perpetuity and there is a trust fund of $50,000 for maintenance. I'm very worried about what could happen to them," he said.

In the RFBPS accounts for the financial year ended February 1980 its total assets were assessed at $899,342.

Mr Nelson said that, although the NFAC and the RFBPS had basically similar aims, their methods of doing things were different.

He said the people who formed the NFAC about seven years ago would have been welcomed onto the membership of the RFBPS, but they chose to go it alone.

"They could have joined our society and strengthened it. They didn't choose to do it and now they want to take over our society," said Mr Nelson.

"We are a royal society. Her Majesty the Queen was gracious enough to give us the title of 'Royal' in our 50th anniversary in 1973 and we are bound to observe peaceful and lawful conduct.

"In all our dealings with government departments, including our activities to ensure the protection of Manapouri, we have dealt with the authorities in a straightforward and honest manner.

"I just cannot say that this policy would be followed by the NFAC and I don't want our society to be encumbered with its activities."

He said there had been an editorial in the NFAC publication "Beech Leaves" in which the editor, Mr Guy Salmon, had said that any public servant who leaked information was doing a public service.

"Although I believe the public is entitled to a lot more information, I do not believe public servants would breach their honour," said Mr Nelson.

"Sitting in trees to protect forest, such as this young man Salmon has done, is not our method.

Inside law

"We would not be prepared to stand in the way of a miller doing his work and we will do what we can in a lawful manner."

Mr Nelson said he was concerned that the RFBPS executive and council were moving to appoint Mr Salmon as director of the society to replace Mr David Collingwood, who they planned to ask to retire after long and distinguished service.

Mr Nelson said the RFBPS treasurer, Mr Roger Tilbrook, had resigned last year because of his concern about the way the new executive had been "spreading money all around the place."

Mr Tilbrook confirmed today that he did not resign for that reason but he was not prepared to elaborate on the matter.

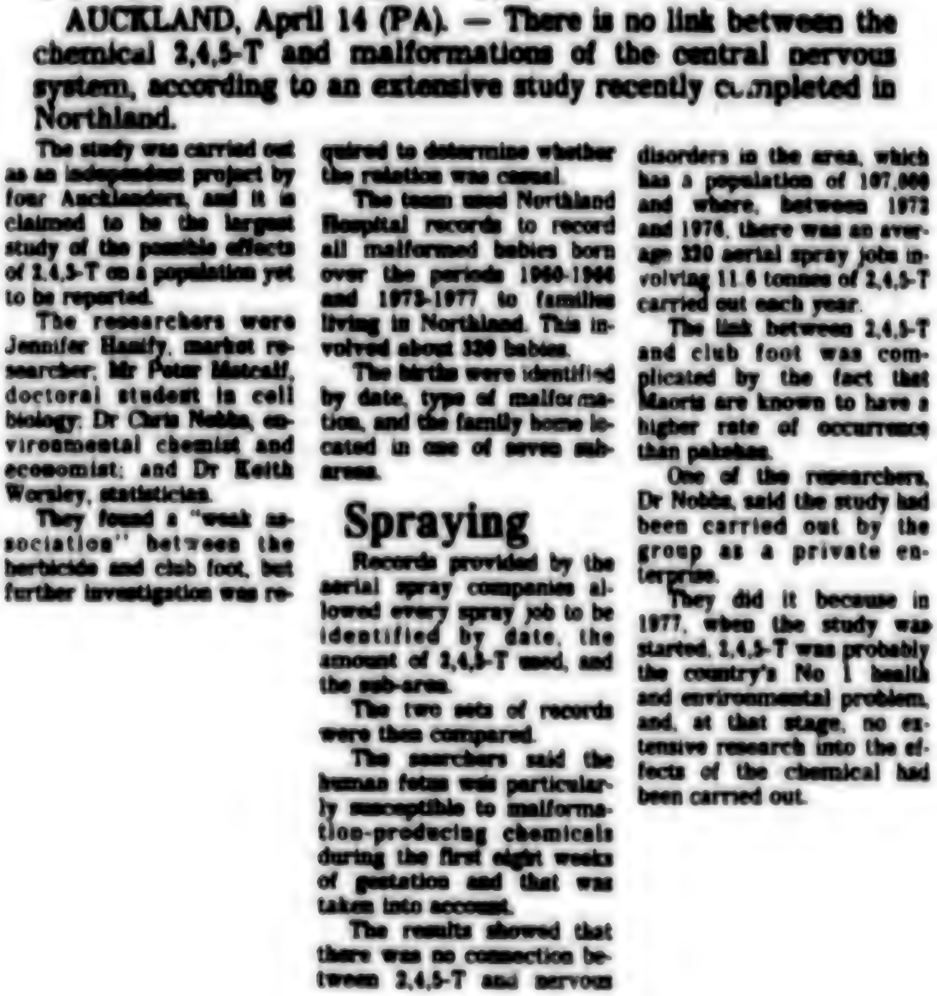
Neither president nor the chairman of the RFBPS could be contacted for comment on Mr Tilbrook's resignation before this issue of the "Post" went to press.

CSO: 5000

STUDY FINDS NO LINK BETWEEN 2,4,5-T, NERVOUS DISORDERS

Wellington THE EVENING POST in English 15 Apr 81 p 9

[Text]



AUCKLAND, April 14 (PA). — There is no link between the chemical 2,4,5-T and malformations of the central nervous system, according to an extensive study recently completed in Northland.

The study was carried out as an independent project by four Aucklanders, and it is claimed to be the largest study of the possible effects of 2,4,5-T on a population yet to be reported.

The researchers were Jennifer Hanify, market researcher; Mr Peter Metcalf, doctoral student in cell biology; Dr Chris Nobbs, environmental chemist and economist; and Dr Keith Worsley, statistician.

They found a "weak association" between the herbicide and club foot, but further investigation was required to determine whether the relation was causal.

The team used Northland Hospital records to record all malformed babies born over the periods 1960-1966 and 1973-1977 to families living in Northland. This involved about 320 babies.

The births were identified by date, type of malformation, and the family home located in one of seven subareas.

Spraying

Records provided by the aerial spray companies allowed every spray job to be identified by date, the amount of 2,4,5-T used, and the sub-area.

The two sets of records were then compared.

The searchers said the human fetus was particularly susceptible to malformation-producing chemicals during the first eight weeks of gestation and that was taken into account.

The results showed that there was no connection between 2,4,5-T and nervous disorders in the area, which has a population of 107,000 and where, between 1972 and 1976, there was an average 320 aerial spray jobs involving 11.6 tonnes of 2,4,5-T carried out each year.

The link between 2,4,5-T and club foot was complicated by the fact that Maoris are known to have a higher rate of occurrence than pakehas.

One of the researchers, Dr Nobbs, said the study had been carried out by the group as a private enterprise.

They did it because in 1977, when the study was started, 2,4,5-T was probably the country's No 1 health and environmental problem, and, at that stage, no extensive research into the effects of the chemical had been carried out.

CSO: 5000

HAURAKI BOARD OPPOSES PROSPECTING, MINING APPLICATIONS

Auckland THE NEW ZEALAND HERALD in English 13 Apr 81 p 2

/Text/ Hamilton--The Hauraki Catchment Board says it will oppose prospecting and mining applications in its area, but denies that its stand will prejudice applications it has received from mining companies for water rights.

The board decided last week to call a halt to mining and prospecting for metal-bearing ores until the Mining Act was reviewed or action was taken to guarantee water and soil protection in the Coromandel, Kaimai and Mamaku Ranges.

But a board member, Mr R. L. Callaghan, said that the board's stand would not prejudice applications by mining companies for water rights.

A tribunal of the board is now considering applications by Amoco Minerals New Zealand Ltd for water rights at Waihi, Kennedys Bay, Coroglen, Coromandel, MacKaytown, Waiomu, Thames and Te Puru.

The board has also received applications from Gold Mines of New Zealand Ltd and Southern Cross Minerals Exploration Ltd to use water in drilling at Otama and Karangahake.

Mr Callaghan said the question of water rights was "a completely separate issue" from that of mining privileges.

The board would oppose applications for mining privileges because the decision to grant them was made by a body other than the board.

Under the Mining Act, the board could not guarantee that water and soil would be protected from prospecting or mining damage or that any damage could be made right.

But the board decided water rights and could imposes conditions to safeguard water and soil.

Mr Callaghan emphasised that the board's stand was not "anti-mining."

All water rights applications would be treated on their merits, he said

The New Zealand director of Amoco Minerals, Mr Peter Roberts, said he was disappointed by the board's stance on mining, but he hoped it would not affect the company's water rights applications.

CSO: 5000

GREAT BARRIER ISLAND SAID 'IRREPARABLY' DAMAGED BY MINING

Auckland THE NEW ZEALAND HERALD in English 15 Apr 81 p 8

[Text]

A Forest Service official claims "irreparable" damage has been done on Great Barrier Island as a result of mining operations.

It could take a century to [illegible] some of the "scars," said Mr Wulf Young, officer in charge of forestry on the island.

Mr Young said the company, Amoco Minerals, did the minimum amount of restoration work required by his department but "you can never return country to the way it was before it was disrupted by the bulldozer, especially in an area like that."

Amoco had been prospecting, mainly for silver, in a rugged area between Whangaparapara and Okupu for about two years. The programme finished last year.

Mr Young said mining companies were "notorious" for wanting to get into an area quickly and out even faster. He added: "I do not like drilling crowds. They are a real headache. They make a mess."

Parts of the Coromandel Peninsula are similar to Great Barrier Island, he said, and he was quite confident no one could restore mined areas to their original state — particularly steep, rugged country like the Coromandel.

The chief executive officer of the Hauraki Catchment Board, Mr R. W. Harris, recently criticised a decision of the Minister of Energy, Mr Birch, to impose bonds on some mining companies to help to pay for any damage caused by their operations.

Mr Harris said that while the bond might be helpful it would not "fix up the unfixable."

Access Roading

The Minister for the Environment, Dr Shearer, wrote recently to the Great Barrier Citizen's Association to say that Amoco had been required to protect the area bulldozed to prevent erosion. It had restored streams to their original watercourses to the satisfaction of the Forest Service, he said.

However, Mr Young has confirmed that he believes the damage is irreparable because of the structure of the area and its exposure to the elements.

He said that while Amoco did the minimum of work required, the damage caused "can never be put right."

The area had probably been restored as much as it could be, he said, without spending impossible amounts of money on it. The company had laid access roading to about 10 drilling sites.

It would be extremely difficult to re-establish vegetation on the stark, rugged area, Mr Young said, and some of the scars could take a century to heal — if they ever did.

Amoco's resident geologist, Mr Peter Roberts, said Mr Young was aware that the company was going back to the Barrier to fertilise and regrass affected areas in consultation with the Forest Service.

Because of the exposed site it was not possible to start a revegetation programme in summer.

It remained to be seen, he said, whether efforts to rehabilitate the area would be successful, but "we have a good chance to restore it."

Anti-mining Lobby

Amoco may continue prospecting on Great Barrier meanwhile. It wants to see if it can find and mine silver on a smaller scale than previously envisaged.

The Minister of Energy, Mr Birch, was asked last night if Mr Young's statement lent force to the anti-mining lobby's argument.

Mr Birch said it was impossible to generalise. He had no doubt some areas could be restored and that in time "scars will heal." In other locations damage would be difficult to repair and this would be taken into account when an application was made.

No one wanted to approve mining operations, least of all him, unless safeguards were part of the licensing procedure.

CSO: 5000

REVIEW OF MINING ACT FINDS MANY DEFICIENCIES

Government-Funded Study

Wellington THE EVENING POST in English 22 Apr 81 p 5

/Text/ A Government funded study has found that there is growing disquiet over the controversial Mining Act, which is "deficient in many respects."

A Wellington firm, Link Consultants Ltd, recently completed a survey on issues of public concern raised by the operation of the Mining Act.

Cabinet yesterday studied Link's report, following which the Minister of Energy, Mr Birch, released it publicly.

Link were also hired by the Governmnet last year to assess the public reaction to the Johnston report on education, but that report has not been released.

The new interest in mining in New Zealand followed the recent increases in prices for many minerals, particularly gold. A rush of applications by mining companies for various licences has also produced disquiet.

Delays

Link said in their report that the mines division of the Ministry of Energy had 1100 applications before it. As this has resulted in a tremendous increase in work load, there had been delays and occasional processing errors.

Link said the growing disquiet over the Mining Act had exposed a number of deficiencies in the act.

Cause

"The concerns that have been expressed by a wide range of people and groups involved in the operations of the act, touch on a number of fundamental principles involving property rights, land-use planning, environmental management and community self determination. Many of the issues of concern involve principles that are fundamental to the New Zealand way of life."

The act had become the subject of concern to both the public and the mining industry, and was the prime cause of the present confusion, anxiety, opposition and delays which characterise its present operation.

"That the Mining Act has been found to be deficient in many respects is not at issue," Link said.

But legislative changes themselves could not solve many of the problems inherent in the act.

"Clear and concise policy for the development of New Zealand's mineral resources must be seen as a prerequisite for public understanding of the legislation and in the consistent application of its provisions."

Link identified the major areas of concern caused by the act.

These were:—

- The provisions for automatic exchange of a prospecting licence for a mining licence;
- That prospecting and mining can proceed without assessment and planning consent under the Town and Country Planning Act;
- The potential risk that mining represented to environmental qualities and systems;
- The impacts of mining not being sufficiently controlled and the inadequate provisions for compensation to communities, individuals and to guarantee rehabilitation and restoration of natural land and water systems.

HERALD Editorial Comment

Auckland THE NEW ZEALAND HERALD in English 23 Apr 81 p 6

[Editorial: "Deficiencies in Mining Law"]

[Text] The fact that the consultants employed by the Government to examine the Mining Act have found deficiencies in the law confirms what conservationists have been saying for some time. Their comment that the public will not accept a licensing system that does not try to define prospecting as well as mining goes to the heart of one of the main objections to the act.

While it is true that the Minister of Energy has the right in certain circumstances not to grant a mining licence to the holder of a prospecting permit many people feel that the exchange of prospecting for mining rights is almost automatic. In such circumstances the Government should heed the strong public demand for more say over the granting of mining licences.

Logic is on the side of environmentalists who contend that until the extent of the mineral wealth of an area has been assessed it is impossible to know how extensively the mining of the territory will affect its environment.

If the Government wants to increase public confidence in the granting of mining applications, the review of the act must at least make the disclosure of reports of Government agencies assessing the proposals mandatory. The present lack of information has made many unnecessarily suspicious of the mining industry and the role that the minister plays.

Environmental Group Attack

Wellington THE EVENING POST in English 5 May 81 p 34

[Text] One of the country's major environmental groups, the Environmental Defence Society, has launched a strong attack on an independent review of the Mines Act carried out for the Government.

A Wellington firm, Link Consultants Ltd, produced a report on a public survey it carried out on attitudes towards mining in this country.

The report to the Minister of Energy, Mr Birch, was released two weeks ago and revealed growing public disquiet over the Mining Act which was "deficient in many respects."

Basis

The EDS attacked what they saw in the report as a preconception that the Minister of Energy should have the ultimate say whether individual mining privileges should be granted.

"On the basis of the society's understanding of public attitudes in this matter, this is an astounding assertion," an EDS statement said.

"The society has itself consistently opposed the aggregation of executive power in the hands of the minister and this point was made abundantly clear to the consultants in discussions held during the course of the inquiries made by them."

The EDS says that on the basis of the assumption that the minister should have the discretionary power and a lack of proper understanding of normal land use procedures, Link have recommended the selective integration of procedures under the Town and Country Planning Act and the Mining Act.

"It is the society's view that the proposals made by the consultants will result in administrative chaos. Further, the consultants have been obliged to undertake an exercise in legal gymnastics in order to allow the minister to retain the final say. This has resulted in the recommendation of a procedure which is both clumsy and unnecessarily complex."

The EDS suggested that it was simpler to have mining applications referred to the local authority in the district who would deal with them under the district planning scheme.

"Applications for mining privileges would be dealt with in the ordinary way by advertisement for public objection, decision of the council and provision for an appeal to the planning tribunal."

CSO: 5000

SEVEN COUNTRIES ESTABLISH REGIONAL ENVIRONMENTAL PROGRAM

Kuala Lumpur BUSINESS TIMES in English 8 Apr 81 p 19

[Article by Dalton de Silva in Colombo]

[Text] SEVEN South Asian countries have established a new international organisation with its headquarters here to tackle the region's environmental problems.

The organisation is called the South Asia Cooperative Environment Programme (SACEP). It was established during a meeting of representatives from Afghanistan, Bangladesh, India, Iran, Maldives, Pakistan and Sri Lanka held in Colombo under the auspices of the United Nations Environment Programme (UNEP).

Nepal, which was not represented at the meeting, has indicated that it would also join the organisation. Bhutan and Burma are also expected to become members later.

Sri Lanka's Prime Minister Ranasinghe Premadasa, in opening the three-day ministerial level meeting, said that the need to find solutions to environmental problems had become urgent.

Mr Premadasa said that a serious preoccupation with these problems was a relatively recent phenomenon in South Asian countries. Paradoxically, these problems resulted from efforts made by the countries in the region to accelerate development. "The dilemma for us in the developing world is that there is also a need for development," he said.

Welcoming SACEP's establishment, Mr Premadasa said it could provide the basis for a joint effort at the regional level to overcome the common problems.

The leaders of all the delegations also welcomed the formation of SACEP as a momentous event in the history of the South Asian countries. They affirmed their belief that this organisation would help their countries to benefit from each other and promote the cause of environment and development.

Dr Mostafa K. Tolba, UNEP executive director, described SACEP's launching as an initiative of "indisputable significance" for South Asia, for the UN and for the world. He stressed the need to achieve harmonisation of environment with development and development without destruction.

A declaration issued at the end of the meeting expressed its intention to foster SACEP as an organisation essential for the promotion of human welfare, development and amelioration of poverty in South Asia.

It also voiced the conviction of the meeting that SACEP and the cooperative arrangements made under it could provide a valuable basis for mutual cooperation in the fields of social and economic development.

According to its Articles of Association, SACEP aims to promote and support the protection, management and enhancement of the environment, both natural and human, of the countries of South Asia, nationally and cooperatively; and to use the resources of the environment to remove poverty and to attain prosperity on a continuing basis."

The policy-making body of SACEP will be a governing council composed of ministerial level representatives of the member countries which will meet once a year. There will also be a consultative committee consisting of heads of diplomatic missions of member countries in Colombo.

The meeting accepted an offer by Sri Lanka to establish the SACEP Secretariat in Colombo. The Secretariat will be headed by a director to be appointed on a rotation basis from member countries in alphabetical order subject to starting with the host country, Sri Lanka. The appointment will be for a period of three years.

Dr Leslie Herath, chairman of Sri Lanka's Water Resources Board, was appointed interim director. A permanent director will be appointed within the next six months.

The new organisation will be funded by contributions from member countries, international institutions and donor countries. Among the international institutions expected to assist SACEP are the United Nations Development Programme, Asian Development Bank, the Kuwait Development Fund and the Arab Development Fund.

The meeting identified 15 areas which need to be tackled early in the field of environment and development. It accepted offers from member countries to act on what was described as "focal points" to plan out programmes for the entire region.

India, the largest country in the region, has undertaken to be the "focal point" for environmental legislation; environmental education training; training in wildlife management; and conservation of corals, mangroves, deltas and coastal areas.

CSO: 5000/8016

DANGER OF SICKNESS FROM CHEMICAL PLANT POLLUTION CITED

Tirana ZERI I POPULLIT in Albanian 8 Apr 81 p 3

[Article by Memo Boci, director of the Directorate of Hygiene and Epidemiology in the Ministry of Health: "Let Us Perfect the Work for the Protection of the Health of Workers in the Chemical Industry"]

[Excerpts] Special attention has always been given to measures of a prophylactic nature for the protection of the health of workers in the chemical industry. They have aimed, in particular, at the elimination of harmful elements such as gases, poisonous vapors, industrial soot, and noise, and the earliest possible detection and treatment of work-related illnesses.

Prophylaxis is not solely the work of health personnel. It is an important duty of the enterprise directorates which, in cooperation with the trade unions and the women's and youth organizations, should undertake joint activities for the protection of the health of the workers.

The chemical industry presents problems of the pollution of the internal and external environment. This is a matter which should receive our attention because, in the future, the chemical industry will be expanding and the number of workers in this sector will become larger. The enterprises of the chemical industry have taken a number of measures for the protection of the internal and external environment. The health cadres and the engineering and technical personnel in the "Gogo Nushi" plant in the industrial zone of Fier have coordinated their work to protect the health of workers and have given us an example of good experience in prophylactic work. They have studied work environments, diseases, and dangers to the health of workers and have taken concrete measures to prevent sickness and accidents.

However, in the polyvinyl chloride plant in Vlore, the superphosphate plant in Lac and the chemical enterprises in Durres and Tirana, the measures set by law have not been taken or are not being implemented because of lack of concern and lack of responsibility. In these enterprises, there have been deficiencies in hermeticization in dangerous processes and there have been leaks from pipes. Measures to eliminate these leaks have not been taken on time. There have been deficiencies in the mechanization of the work processes and in the installation of a proper ventilation system.

In the enterprise health centers there has been an increase in the number of visits for medical treatment for sicknesses resulting from the use of various pieces of equipment but the statistics are not broken down according to equipment or according to seniority in work. The doctors and the other health personnel in the enterprises have not been as active as they should be in the struggle to eliminate the causes of the pollution of the environment both inside and outside the enterprise and in demonstrating what has an influence on the health of workers. The appearance of occupational illnesses and work accidents is the final link in a process and therefore, the work should be concentrated, first of all, on preventive measures under the auspices of the health inspectorate, in close cooperation with the sector for technical security and labor safety. There have been cases where they have not intervened with the necessary force to insure that workers are equipped with individual and collective means of protection. There have been cases where this equipment has not been used.

CSO: 5000/3016

CARIBBEAN SEA THREATENED BY PETROLEUM CONTAMINATION

Bogota EL TIEMPO in Spanish 25 Feb 81 p 10-A

[Article by Nizam Ali]

[Text] Port of Spain, 23 Feb (AFP)--It was pointed out here today that the Caribbean Sea, second largest in the world in area, could become a petroleum cesspool as a consequence of the massive contamination caused by 73 crude-oil refineries located on its shores.

After the China Sea--with an area of almost 3 million square kilometers--the Caribbean is the largest sea on the planet, greater than Europe's Mediterranean, having a total surface of 2,515,914 square kilometers.

Port of Spain is the capital of Trinidad and Tobago, a Caribbean English-speaking state, consisting primarily of the islands of Trinidad and Tobago although there are other miniscule isles which belong to this country located off the northeastern coast of Venezuela.

Trinidad and Tobago has an area of 5,128 square kilometers and has 1,285,000 inhabitants, mostly black.

According to government figures, the country produced 213,000 barrels of oil per day in 1979 and its proven reserves of crude are estimated at 655 million barrels.

Two of the 73 oil refineries in the Caribbean are in Trinidad and this nation is the greatest producer of crude in the Caribbean, a region where petroleum deposits are scarce, except for Venezuela and Mexico, two giants in the world production of oil.

There are about 50 oil ports in the Caribbean, especially designed to load ships of up to 500,000 tons dead weight.

Supertankers of cosmopolitan registry cross the Caribbean in all directions and their very presence is considered by the governments on its shores to be a permanent danger of contamination.

Reports on this subject were given prominent coverage in the local press today, precisely when a UN meeting on this subject was being opened in Managua, capital of Nicaragua.

A total of 66 specific projects on this subject will be studied at this international assembly.

Because of its proximity to the Panama Canal the Caribbean of necessity also becomes a traffic route for the transportation of oil between the Atlantic and Pacific or vice versa.

In addition, Cuba and the Dominican Republic, the two most important Caribbean nations, are net petroleum importers.

The coastal countries are studying--and are seeking international assistance in this--several actions for preserving the waters of the Caribbean from oil pollution, and plans have been made for special air and surface fleets for monitoring the routes and the safety measures of the supertankers.

The Caribbean pollution is no longer a problem of the open sea only, but also the tourist beaches of the Caribbean, a source of income for all the island states, are beginning to suffer their first damage from this phenomenon.

In conclusion, it was felt in Port of Spain that the collisions of supertankers, such as the one which occurred in 1979 off the coast of Tobago and which caused the loss at sea of thousands of tons of oil, are a continuing cause of concern to all the coastal governments.

9204
CSO: 5000/2098

IXTOC WELL STILL AFFECTING COASTAL ECOLOGY

Mexico City EL SOL DE MEXICO in Spanish 21 Apr 81 p 2-A

[Article by Elena Gallegos: "There Will Be Drastic Changes in the Tabasco Coast Due to the Ixtoc Well Spill"]

[Text] Research performed by the National Autonomous University of Mexico [UNAM] has found that the spill of the Ixtoc I oil well had a significant impact, especially on the coastal lagoons of El Carmen, Machona and Mecoacan, in Tabasco and in the port of Dos Bocas, where drastic changes will occur due to the great movement of crude.

In addition, in the State of Tabasco, which has a continuous, well-connected hydrologic system, several pollutants come together and flow into the coastal lagoons and other areas the researchers noted.

"Thus, certain pesticides used in agriculture and wastes from the washing of mills have been observed in these areas. It has been observed that after the machinery is cleaned, there is a high mortality of fish and other species."

After noting that little is known about the biological and physiological effects of pollution, in particular of hydrocarbon pollution of coastal waters and estuary systems, they added that, for this reason, research will continue.

These investigations are led by Dr Alfonso Vazquez Botello, of the UNAM Center of Sea and Lake Sciences, who works with a group in the laboratory of Marine Chemistry and Pollution to evaluate the impact caused by the presence of hydrocarbons and other pollutants in the coasts of Veracruz, Tabasco, Campeche and Quintana Roo.

These studies have demonstrated the presence of aliphatic and aromatic hydrocarbons similar to those found in petroleum, organic compounds which in some cases act as powerful poisons and in others as carcinogenic agents.

It is clear, then, that there was a significant impact from the spill of the Ixtoc I oil well, a spill which ocurred in June 1979 in the Sonda de Campeche. However, due to the dynamism of the area and the degree of natural weathering of the oil spilled, the hydrocarbons remained in the region a relatively short time.

In addition, a large part of the crude was deposited on the coastal region and the rest was transported by the currents toward other areas; its final destination remains unknown.

Finally, analyses of commercially-important biological species, mainly shrimp and fish, show that these organisms did not retain in their tissues any components of the crude oil spilled, which could have jeopardized their sale and, consequently, would have weakened the country's economy.

Even biological evaluations of the shrimp population indicate that the abundance and diversity of different species were not altered as a result of the spill.

9341
CSO: 5000/2118

PROCESS DEVELOPED TO DETECT SMALL CONCENTRATIONS OF POLLUTANTS

Tel Aviv MADA' in Hebrew Sep 80 pp 175-180

[Article by Mikhael Zaltkin: "The Opto-Acoustical Effect"]

[Text] In recent years a substantial effort has been invested in developing methods for discovering air pollutants in extremely low concentrations. In general, one speaks of a few molecules of pollutant in a billion molecules of air. A number of methods are already known for making measurements of this sort. The most common is the gas chromatography method. Most methods have two shortcomings: a) they require specific equipment or special preparations for each pollutant; b) the measurement period is a long one, in general a number of minutes.

At the beginning of the 1970's, it seemed that the effect which was discovered by Alexander Graham Bell about 100 years before would enable the detection of air pollutants at low concentrations of two to three parts per billion. Moreover, a single device would enable the detection of a substantial number of pollutants, and their identification, and the measurement would last only a few seconds. What is being referred to is the opto-acoustical effect; its application to measurements of such a high degree of sensitivity was enabled by virtue of the development of directing frequency lasers radiating in infra-red. As will be seen below, the effect also serves for measurement of very weak molecular absorption factors. A similar effect is also applied for measurement of very weak absorptions in liquids and in solids.

Tones From Laser Beam

The opto-acoustical effect is a process of producing tones following the projection of a gas in light beams (Figure 2). Let us assume that in the chamber drawn in Figure 2a there is contained, in addition to air, a "pollutant" gas (indicated by black dots) in a low concentration. Let us also assume that the spectrum of absorption of the gas "pollutant" matches the spectrum of emission of the light source, and that the "pure" air, which is composed mainly of nitrogen oxygen, and argon is transparent to this projection of light (a correct assumption for most of the light sources which serve for the detection or air pollutants). Because of the coordination of the spectrum of absorption of the "pollutant" gas in the container with the spectrum of emission of the light source, some of the beam passing through the chamber will be absorbed into it.

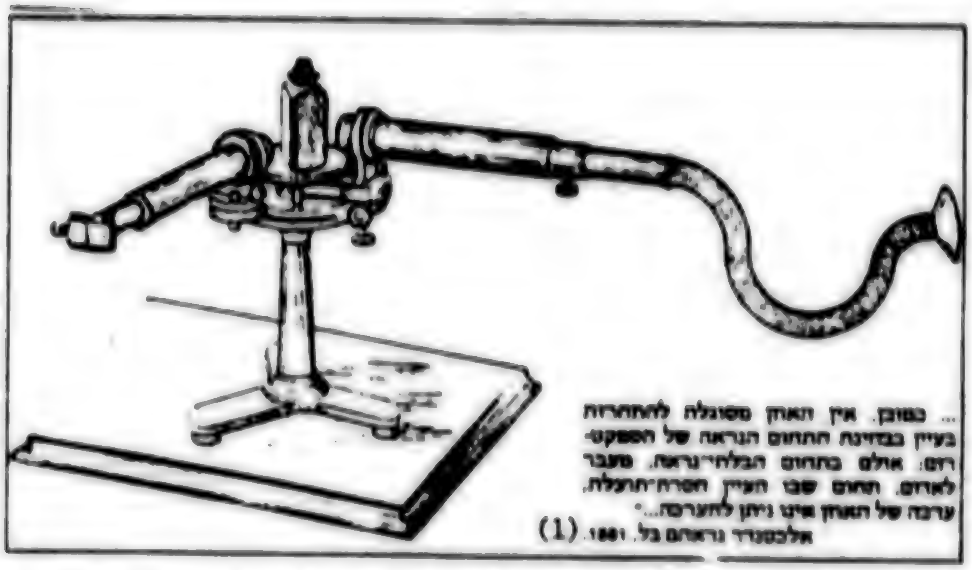

... כמובן, אין האוזן מסוגלת להתחרות
בעין בבחינת התחום הנראה של הספקט-
רום; אולם בתחום הבלתי-נראה, מעבר
לאדום, התחום שבו העין חסרת-תועלת,
ערכה של האוזן אינו ניתן להערכה...
אלכסנדר גראהם בל, 1881 (1)

Figure 1. Spectrophone Constructed by Alexander Graham Bell.

Key: (1) "...Of course, the ear is unable to compete with the eye in terms of the range seen in the spectrum; but in the unseen realm, at infra-red, an area in which the eye is of no advantage, the value of the ear is inestimable...."

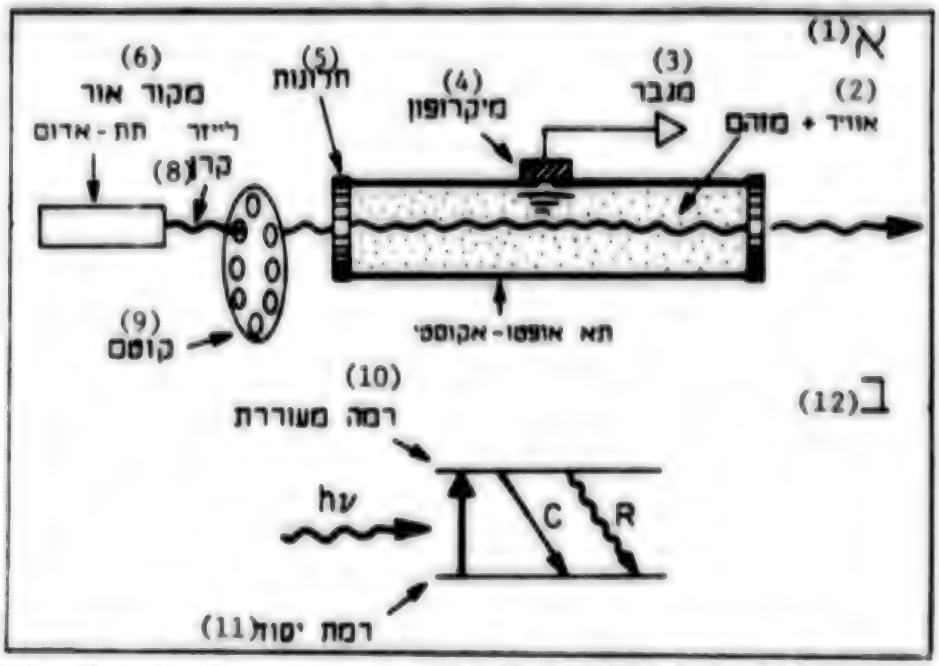


Figure 2: (a) Sketch of an opto-acoustical chamber beamed by means of a chopped light source; (b) The opto-acoustical effect. A molecule of air pollutant, at a low energy level, absorbs radiation (hv) and is raised to a higher energy level. The absorbed energy is released in a fluorescen. radiation process (R) or as a result of collisions with air molecules; (c) Since the second process is more rapid than the first, then the absorbed energy is transferred as kinetic energy to the air molecules, and as a result the temperature and air pressure in the opto-acoustical chamber rise.

Key:

(1)	a	(5)	Windows	(9)	Chopper
(2)	air + pollutant	(6)	Light source	(10)	Increased level
(3)	Amplifier	(7)	Infra-red laser	(11)	Base level
(4)	Microphone	(8)	Beam	(12)	b

As a result of this, molecules of the absorbing gas will be raised to an energy level higher than the level of the base in which they are found. Later, the molecules which have a raised energy level will lose the energy which they have absorbed in one of two ways: a) spontaneous emission of light (fluorescence); b) collision with the air molecules surrounding them. In the second process, the energy contained in the pollutant molecules will be transferred to the air molecules as kinetic energy, and thus the air will become heated. If process b) occurs at a greater speed than process a), then the projection of the "polluted" air in the light source and the chamber will cause the increase in pressure to be cyclical. Thus, an acoustic wave (tone) will be received, at the frequency of the chopper, within the chamber. This acoustic wave can be recorded by means of a sensitive microphone placed in the chamber. The strength of the tone will be in direct proportion to the concentration of the polluting gas in the chamber as well as to the projection output of the light source.

As was already noted, the opto-acoustical effect will be apparent if the process of transfer of energy from the molecules whose energy is raised because of the absorption of light, to the air surrounding them is more rapid than the process of fading emission (fluorescence).[1] This is the circumstance because of the variable levels of energy of the molecules in the infra-red area: the duration of radiation is one-thousandth of a second while the time necessary for the transfer of energy to the air in the form of heat, by collisions, is a millionth of a second under atmospheric air pressure. Therefore, the practice is to radiate opto-acoustical chambers with infra-red light sources (in general at a wave length of 14-2 microns). This has two other advantages: the principal components of air are completely transparent to this radiation, while most of the air pollutants which we are interested in detecting have strong absorption lines, and are characteristic of all pollutants in the infra-red area. This character enables the identification of the pollutant by setting the light source to the wave length series and infra-red opto-acoustical spectrum of the pollutant, in the traditional manner of identifying materials in chemistry laboratories by means of a spectrometer to infra-red.

The opto-acoustical effect, as described above, was already used commercially 30 years ago, for the detection of air pollutants in concentrations of one part per million. At that time, the detection device was called a spectrophone, and it involved the integration of spectroscopy at infra-red, and the creation of acoustical waves. The light sources were glowing black bodies, which remains the practice today with spectrometers at infra-red. But the development of directing frequency lasers at the end of the 1960's and the beginning of the 1970's, and their use as light sources in spectrophones increased the sensitivity several fold. The reason for this will be understood by examining Figure 3: the width of the molecular absorption lines at infra-red depends upon the air pressure surrounding the molecule. At atmospheric pressure, the width of the line is about one gigahertz (10^9 hertz) and equals one of the amounts of time between two collisions of an absorbing molecule and air molecules (10^{-9} seconds). This width is approximately one ten-thousandth (10^{-4}) of the width of the emission curve of the glowing black body at a temperature of 1000° Kelvin (above

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[1] See "Non-Radiating Processes" by Binyamin Engelman, MADA' 23, 3-4 (1979) pp 158-162, 180.

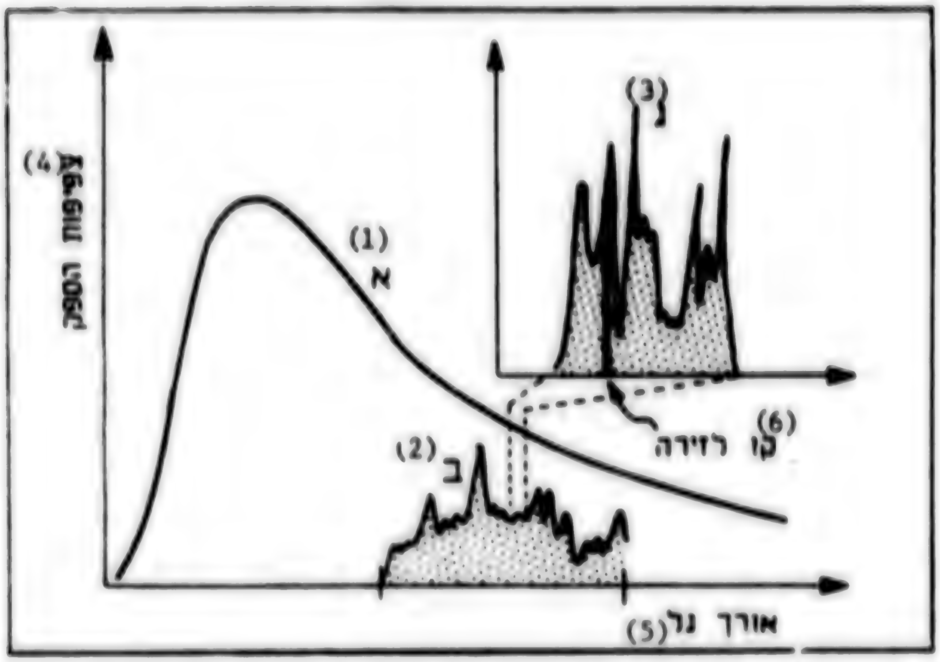

Figure 3. (a) Emission curve of the glowing black body, at temperature of 1,000° Kelvin = T most of the radiated output is in the infra-red wave length area (wave length 2-14 microns). (b) Characteristic absorption curve of a gas in the infra-red area. The spectral separation is about 0.05 microns. (c) Section of the absorption curve in (b) in a detailed picture, with a separation of about 10^{-4} microns (10^{9} hertz). The characteristic laser line (the thick section) is completely absorbed at the single high point of absorption.

Key:				
	(1)	a	(4)	Density of output
	(2)	b	(5)	Wave length
	(3)	c	(6)	Laser line

absolute zero). Therefore, if we beam the opto-acoustical chamber with a thermal source (the black body) at a characteristic output of one watt, then only 10^{-6} watts of radiation will be absorbed in a specific spectral absorption line. In contrast to this, the width of the emission band of a laser at an output of one watt directed at a wave length congruent to the absorption line will generally not exceed 1 megahertz which is one-thousandth of the width of the absorption line. Therefore, the whole output will be absorbed in the given absorption line, and the sensitivity will be increased fourfold. A change in the wave length of the laser will enable the identification of the absorbing material (Figure 4).

Having understood the controlling apparatus in the opto-acoustical effect, let us go back 100 years and note that Alexander Graham Bell used the rays of the sun as a light source. The absorbing gas, generally in high concentrations, as well as other materials such as blackened wool, he sealed in a transparent test-tube, which he set behind the chopper which was manually operated. Instead

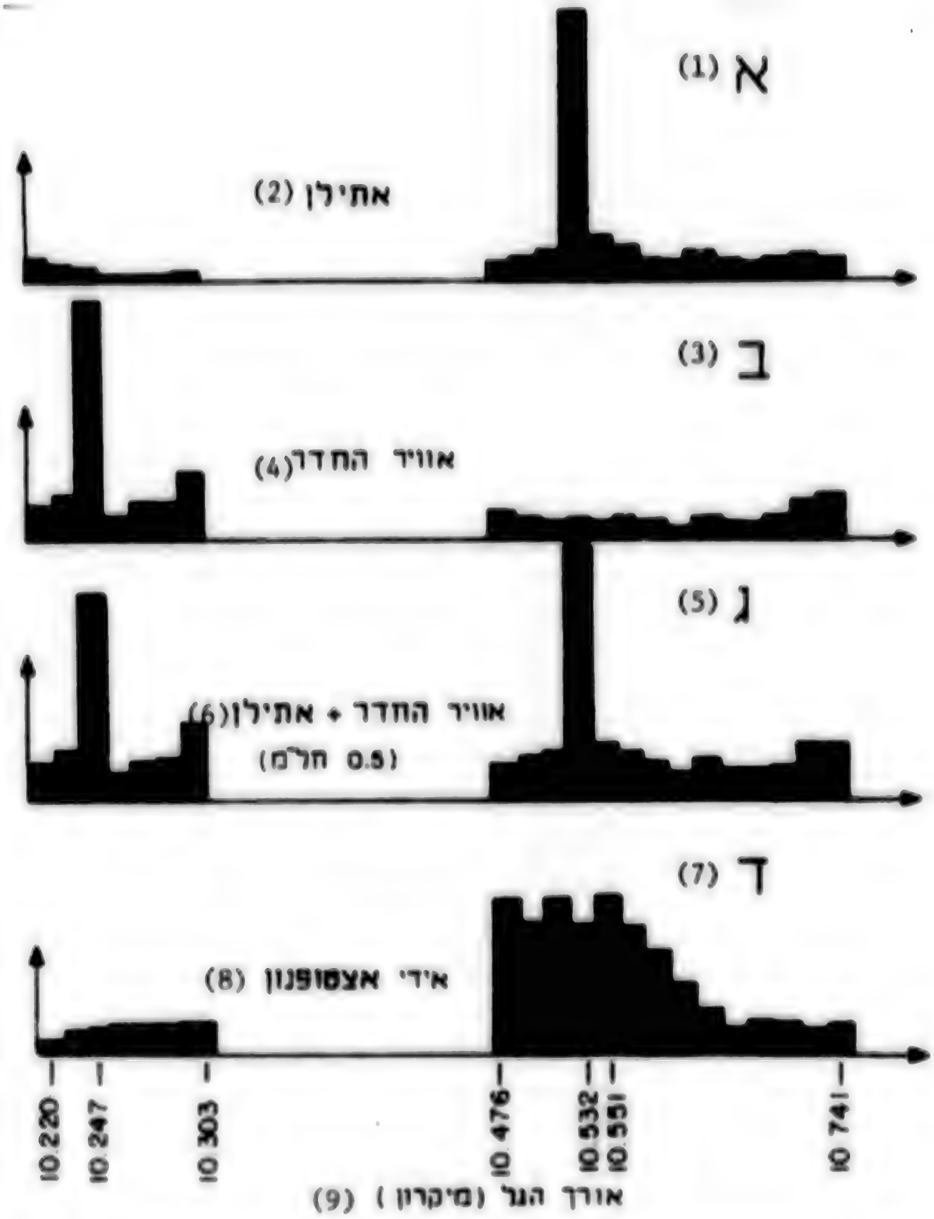

Figure 4. Detection of air pollutants (example of ethylene, which penetrates the air of a room) and their identification by means of opto-acoustical spectroscopy. The bars describe the opto-acoustical signs at various wave lengths produced by a CO_2 laser. (a) The opto-acoustical sign produced by pure ethylene. (b) The opto-acoustical sign produced by room air. It is primarily the water vapor in air which contributes to the relatively strong sign at a wave length of 10.247 microns. (c) The opto-acoustical sign produced by room air with the addition of ethylene at a concentration of 0.5 parts per million. The relatively strong sign at a wave length of 10.535 microns makes possible the identification and detection of ethylene by means of a limited number of spectral lines. (d) The opto-acoustical sign produced by acetophenon vapors. In contrast to water vapor and ethylene, there is not a single spectral line which constitutes a clear identifier for acetophenon, and this is the case for most gases.

Key:
(1) a
(2) Ethylene
(3) b
(4) Room air
(5) c
(6) Room air + ethylene (0.5 parts per million)
(7) d
(8) Acetophenon vapors
(9) Wave length (microns)

of a microphone for detecting the opto-acoustical tone, he installed a horn which began in the test-tube, and ended next to the ear of the experimenter. The tones which were produced were sometimes so strong that even people standing next to the experimenter could hear them. After a protracted series of experiments with dozens of absorbing materials, including liquids and solids (regarding this see the end of this article), Bell achieved only a partial understanding of the opto-acoustical effect. He explained the effect in gases together with Tyndall. Bell did not succeed in explaining the effect in liquids and solids. It should be noted that Bell experimentally discovered the importance of the infra-red component in rays of the sun for creating the effect in gases. Bell coined the term spectrophone. Without going into detail here, it is interesting to note that the opto-acoustical chambers served Bell as detectors in the optical communications systems which he built.

The Power of the Opto-acoustical Effect

It is possible to calculate the volume of the tone which is received in the opto-acoustical effect as follows: α will designate the absorption factor of the polluting gas located in the chamber. α indicates the percentage of the absorption in the absorption path at a length of 1 centimeter and an absorbing concentration of 100 percent at atmospheric pressure. For the absorbing concentration c, chamber length L, and output of laser beam W_0, the absorption of output in the chamber will be: $W = W_0(1-e^{-\alpha cL})$. At a low concentration c, we get approximately $W \approx W_0 \alpha cL$. The absorbed output will be cut at the frequency of the rotation of the chopper, f. Every cycle of absorption which lasts $t = 1/f$ will be accompanied by a rise of temperature ΔT determined by two factors: conduction of the heat K of the gas in the chamber, which is responsible for the loss of heat to the chamber walls, and the thermal capacity C. At a high frequency of cutoff, exceeding K/C, the heat created in the chamber will not have a chance to get through the walls of the chamber before the end of the cutoff cycle, and therefore the thermal conduction K will not have any effect on the cyclical rise in pressure, ΔP. ΔP is determined by the thermal capacity of the gas in the chamber. If we indicated with ΔE the energy which is absorbed in the chamber during the cycle whose duration is t, then we get $\Delta E = Wt = W/f$. From the equation of the gases, we get close to $\Delta E \approx V\Delta P$, where V equals the volume of the opto-acoustical chamber (the precise equation depends upon the type of gas, but we are seeking only a proportionate estimate of ΔP). We can thus record:

$$\Delta P \approx \frac{W_0 \alpha c L}{Vf} = \frac{W_0 \alpha c}{Af} \qquad (1)$$

where A equals the area of a cross-section of the chamber. ΔP is the opto-acoustical sign. We will now put typical numerical values into formula (1) for the opto-acoustical measuring system:

1 atmos.$^{-1}$cm^{-1N} = α (the characteristic absorption factor at infra-red);
1 watt $\cong W_0$ · 1 cm^2 = A; 10 hertz = f. Because the concentration of 1 part per million = c, we get an opto-acoustical pressure sign of 1 microbar = ΔP (1 microbar = 10^{-4} atmosphere). For purposes of comparison, in normal conversation tones are produced at a pressure range on the c [illegible] of one-tenth microbar.

In order to determine the minimum concentration which can be detected by means of the opto-acoustical effect, we compare the cyclical pressure sign ΔP to the random signs ("noise") emitted by the microphone which measures the pressure sign within the chamber. The random signs produced by good commercial microphones limit their measuring capacity to pressure signs above 10^{-4} microbars because of the width of 1 hertz of the band, which means that the duration of the measurement process is 1 second. Under these conditions, there will be a minimum concentration of C_{min} which can be detected in the opto-acoustical chamber, which was computed above:

$$C_{min} = 1 \text{ part per million} \times \frac{10^{-4}\text{microbars}}{1 \text{ microbar}} = 10^{-10}$$

Attention is directed to the fact that in the course of measurement, which lasts 1 second, the laser beam is one spectral line. For purposes of identifying measured materials, it is necessary to display a number of spectral lines. Therefore, the measurement time will include a few seconds. This duration is still considerably shorter than the time required in gas chromatography. The theoretical limit for the minimum concentration of air pollutant which can be measured by the opto-acoustical technology is determined by the noise of the thin microphone membrane, ideally placed in the opto-acoustical chamber. The thermal conduction and air viscosity of the chamber determine the noise. We shall not enter into detail here regarding estimates of the power of the noise in opto-acoustical chambers, but merely note that theoretical calculation indicates that in a chamber whose dimensions are as noted above, this noise limits the measurement of the concentration of most air pollutants to a rate of $1:10^{14}$ (duration of measurement being 1 second)!

Measure of Absorption as Opposed to Measure of Passibility

As we have seen, the opto-acoustical effect is a sensitive means for measuring the absorption of infra-red radiation by a gas. The question may be asked as to why the opto-acoustical technique of measurement is preferable over the apparently simpler method, as follows: gas is contained in a chamber having transparent windows through which an illumination source is shined from one side at an output of W_0 (similar to drawing 2a). We then measure from the other side of the chamber the output of light which passed through the chamber, both before the gas is in the chamber and then after the gas has been put in the chamber. The difference of the results of measurement will determine the degree of absorption of the gas, and assuming that we know the absorptive factor of the gas, also its concentration.

This question is answered by the following numerical example: let us assume that we wish to measure an air pollutant at a very low concentration, one part per million ($C = 10^{-9}$). Let us put in the numerical values which were used in the example for calculating the power of the opto-acoustical effect. As was already noted, with an absorption chamber with a length of L, the absorption in the gas will be W_a: $W_a \approx W_0 \alpha cL$. Therefore, the radiation which passes through the chamber and is measured on the other side of it will be $W = W_0(1-\alpha cL)$. The output which will be measured before the gas is introduced into the chamber will be W_0. The concentration of the gas will be determined by the difference $W-W_0$.

The maximum precision of measurement achieved today with a commercial device is 0.01 percent, so that if we want to distinguish between W and W_0, we will require $acL > \frac{1}{10,000}$, or in other words, $L > \frac{1}{10,000_{ac}}$. According to the numerical values $1\ atmos^{-1}cm^{-1}\ ac = 10^{-9}$, we get $1\ km = 10^5 cm < L$. It would thus be necessary to have an absorption chamber with a length of 1 km. An absorption chamber having an effective length of more than 1 km has already been constructed through the use of many reflecting mirrors, with the actual length of the chamber only 20 meters, but the cost is extremely expensive. We thus see that the advantages of the opto-acoustical technique, which uses short chambers, are in the direct measurement of absorption signs which are small, in contrast to the measurement of a small difference between two large transit signs.

It is interesting to note the practical character of the limitation of long absorption chambers. The theoretical limit of precision of the measurement of radiations W_0 or W passing through the chamber (thus the difference $W - W_0$) is determined by the quantum tremor of the radiation source. If the number of photons passing through the chamber during the time of measurement t is $N = W_0t/hv$, where hv is the energy of a photon escaping from the radiation source, then the "tremor"--i.e. the random movement (fluctuation) δN in counting the number of photons passing through the chamber, will be $\delta N = \sqrt{N} = \sqrt{W_0t/hv}$. The tremor δW_0 of the measured output will be $W_0/\delta W_0 = \frac{hv \cdot \Delta N}{t} = \sqrt{\frac{W_0hv}{t}}$. This is the limit of precision in measuring $W - W_0$. For an output of 1 watt = W, a light source whose frequency is $\gamma = 3 \times 10^{13}$ hertz, coordinated to a wave length of 10 millimicrons = λ and a measurement duration of 1 second = t, we get 10^{-10} watts $\approx \delta W_0$. The precision of measurement will thus be $1/10^{10}$, 6 times higher than the practical precision which was mentioned above (0.01 percent).

Resonators for Measuring Air Pollution

With the operation of opto-acoustical chambers by means of lasers, first by Kreuzer in 1971, the first limitations of the new yet old technique were revealed. Kreuzer used an opto-acoustical chamber of the type drawn in Figure 5a, by means of a He-Ne laser which was operated at a wave length of 3.39 microns. The opto-acoustical chamber produced background signs which appeared although there was no absorbing pollutant present. These signs stemmed from the absorption of part of the radiation passing by way of the chamber through its windows. These windows were not absolutely transparent. Because of this, the windows heated up, and transmitted this heat, in part, to the air contained in the chamber. The rise in pressure which accompanied this process was measured as an opto-acoustical background sign. In principle, it is possible to distinguish between a background sign caused by the window and that caused by an atmospheric pollutant, in the chamber. The spectrum absorption of the window is different than that of most pollutants. But the inability to precisely measure this background sign (similar to the situation of long absorption chambers) posed a limit to the ability to measure low concentrations by means of the opto-acoustical chamber. The limit of practical sensitivity was a gas concentration on the order of $c \approx 10^{-8}$ (10 parts per billion).

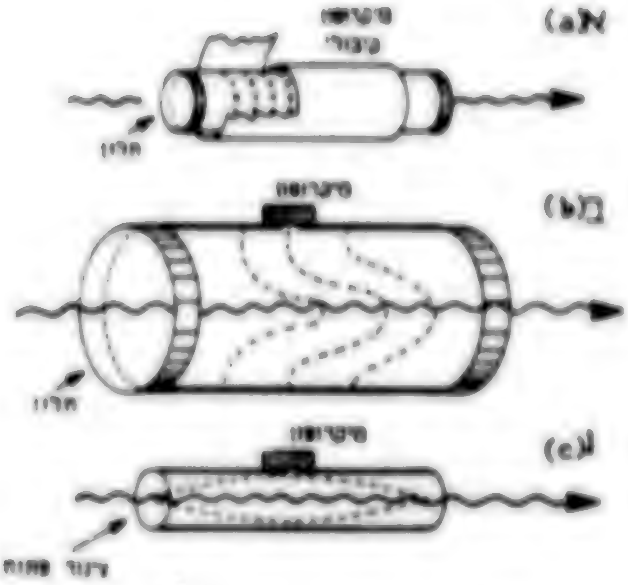

Figure 5: (a) The nonresonating opto-acoustical chamber of the type first operated by Kreuzer. The chamber uses a capacitive microphone, composed of two "boards": the body of the chamber and the membrane of milar which is covered on the outside with aluminum. The membrane covers the chamber and thus it creates with the chamber an electric capacitor. The drilling of small holes in the chamber makes possible the transfer of the opto-acoustical pressure sign from the chamber to the membrane and the pushing outside of it. This push changes the distance between the membrane and the body of the chamber, and as a result the measured electrical capacity. The change in capacity is the measure of the pressure sign. The diameter of the chamber is about 5 mms and its length is 50 mms. (b) The latitudinal opto-acoustical chamber. The manner of the latitudinal resonance variation marked by the dashed line develops along the length of the walls of the chamber. The width of the chamber is great (50 mm). The chamber is selected so that too high a chopper frequency will not be required, which would reduce the opto-acoustical sign. (c) The longitudinal resonance opto-acoustical chamber. The manner of fluctuation is marked by the dashed line. Since the pressure sign in the manner of fluctuation shown is reduced to zero in the area of the windows, there is no need for them and thus the contribution of the window to the background sign disappears.

The limitation of the background sign is linked not only to the absorption of radiation by the windows of the chamber. Even the walls of the chamber can absorb radiation, both from the reflections and dispersal from the windows, as well as because of possible contact between the walls and the edges of the shiny aluminum. The latter possibility in fact limits the possibilities of reducing the diameter of the opto-acoustical chamber, a fact which limits the increase of the opto-acoustical sign by the reduction of A in formula (1).

An interesting solution to the opto-acoustical background sign problem was proposed by Dewey and Kamm in 1974 (Figure 5b). They built an opto-acoustical chamber with a diameter of 5 cms, and operated a mechanical chopper between the light source and the chamber at a frequency equal to the acoustical resonance frequency of the chamber. Working the chamber at a high resonance frequency, f, (in this case 8 kilohertz) reduced the pressure sign ΔP, which is proportional to $1/f$ (formula (1)), but compensation for the reduction of the pressure sign was obtained by the creation of a standing acoustical wave in the chamber, which increased the pressure sign considerably. An additional compensation for using the chamber at a high chopper frequency is linked to the "noise" which limits the minimum gas concentration which can be measured: at high frequencies, most of the external tremors in the measurement system are small, such as the environmental acoustical tremor, as well as tremors contributed by the electronic amplifier of the measuring microphone.

Let us now return to the background sign--this sign, which is caused by the windows, is about two times as small in the resonance chamber. The reason for this is contained in the symmetry of the resonance oscillation: this oscillation runs along the whole length of the chamber. The absorption of radiation by the gas within the chamber also extends along the whole length of the chamber, and thus there is a good coupling between the energy raising pressure sign and the resonance oscillation. This is not the case where the raising of energy is the result of absorption of radiation by the window. This absorption is limited to one point and thus the coupling to the resonance oscillation is deficient.

A further reduction of the background sign, to a level lower than the power of the random tremor produced by the chamber microphone, was achieved in a resonance chamber of a different sort (Figure 5c). The chamber is long and narrow, similar to the chamber in Figure 5a, but the windows which contain the gas have been removed from it. The chopper frequency selected is the basic longitudinal oscillation of the open tube, which now serves as the chamber. Since a standing acoustical wave has been created, a high opto-acoustical sign is obtained, in spite of the absence of windows. Obviously the absence of windows, which can absorb radiation, assures the absence of a background sign. The tremor produced by the small commercial microphone which has been coupled to the chamber limited the ability to measure the gas ethylene in nitrogen to a concentration of 0.3×10^{-10} (duration of measurement 1 second). To prevent the penetration of external acoustical tremor, the open tube which serves as the opto-acoustical chamber has been placed in a container. Windows of the large chamber contributed a background sign of a force less than the force of the tremor produced by the microphone. Figure 6 is the photograph of the longitudinal resonating opto-acoustical chamber. The resonator--a narrow open tube--and the microphone linked to it appear in the center. An important advantage of the longitudinal resonating chamber is the possibility of performing the measurement of air

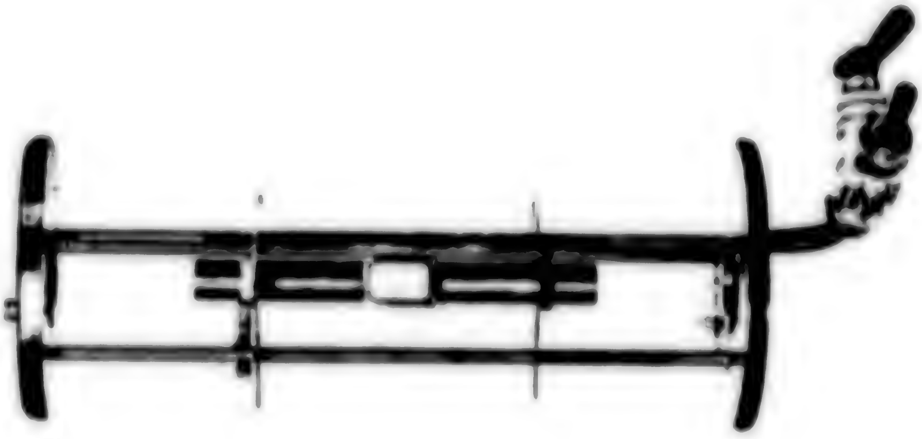

Figure 6: The longitudinal opto-acoustical resonance chamber. The acoustical resonator--a narrow tube open ended--and the microphone coupled to the wall of the tube are seen in the center. The opto-acoustical sign is transferred from the resonator to the microphnoe by way of a small hole bored in the tube. Also seen are the framework of the container which envelopes the chamber, and the air pumping tap joined to it. The air enters by way of an additional hole which is bored in the walls of the container which envelopes the chamber.

pollutant at a true time while flowing the air measured through two taps which have been attached to the container which envelopes the chamber.

Another improvement in the technique of measuring by the opto-acoustical effect is the use of an opto-acoustical chamber in conjunction with the laser resonator itself. Since the radiation power within the laser resonator, which is the chamber in which the laser radiation is created, is higher than the power which the laser radiates outside of the resonator, then there is achieved, in this way, a very high opto-acoustical sensitivity, without investing additional electrical output to operate the laser. This point is important for the reduction of the dimensions of the opto-acoustical measuring system. These are determined principally by the dimensions of the laser which operates the system. Shown in Figure 7 is the result of the measurement of a concentration of ethylene in the air of the laboratory as a function of time, after the dispersal of the ethylene at an initial concentration of 10 parts per million. The measurement was carried out by use of a longitudinal resonance chamber, but without windows in the external container which envelopes the chamber. The air polluted with ethylene entered the chamber by itself through diffusion, but without pumping air into it. The opto-acoustical chamber was set within the resonator of a carbon dioxide laser. The external acoustical tremor in the room was rather high--above 60 decibels--but in spite of this it was possible to detect ethylene, at the correct moment, at a concentration of 5 parts per billion.

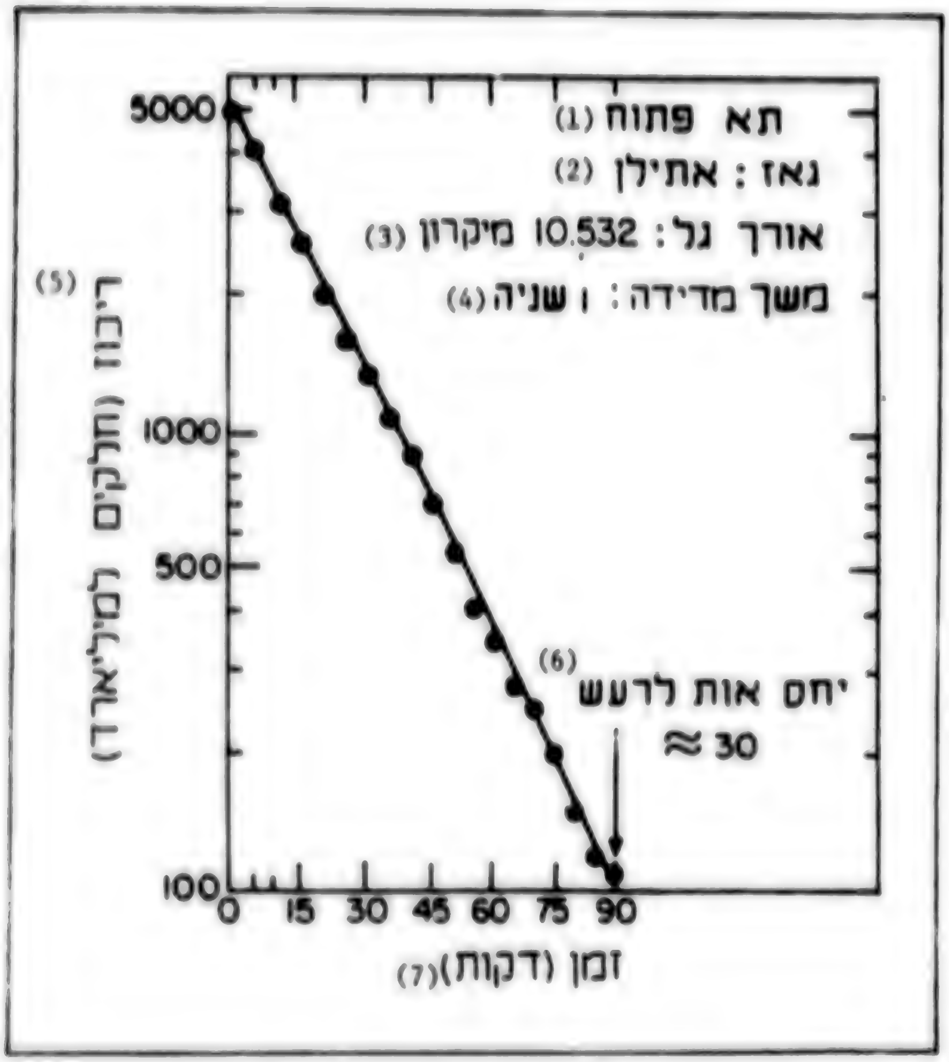

Figure 7: Concentration of ethylene in the air of the laboratory as a function of time. The measurement is carried out at the true moment by use of an opto-acoustical longitudinal resonance chamber set in the CO_2 laser resonator. The opto-acoustical chamber was completely open, and thus there was no need to pump air into it. In spite of substantial external acoustical tremor, at a rate of 60 decibels, the sensitivity of measurement reached a concentration of parts per billion.

Key:

(1)	Open chamber	(5)	Concentration (parts per billion)
(2)	Gas:ethylene	(6)	Ratio of sign to tremor
(3)	Wave length: 10.532 microns	(7)	Time (seconds)
(4)	Duration of measurement: 1 second		

Opto-Acoustical Spectroscopy and Light Sources

Opto-acoustical spectroscopy of gases--in the modern meaning--was enabled by the development of lasers which radiate in the infra-red and whose wave lengths can be changed. The change of wave length is necessary in order to identify air pollutants. There is a very broad variety of lasers which answer the needs of spectroscopy in infra-red. By means of them it is possible to cover most of the range of wave lengths common in spectroscopy. At the same time, most of the lasers of this type are at the disposal of only a few laboratories. In Figure 8 are noted most of the usual lasers for infra-red work as well as the range of wave lengths which they cover. The most common lasers in the infra-red range are carbon dioxide (CO_2) lasers. With these lasers it is possible to produce outputs exceeding a few watts at more than 80 different wave lengths. CO_2 lasers operate in the range of wave lengths of 9-11 microns, while CO lasers radiate in the range of 5-7 microns. The radiation in both of these ranges is isolated, and not a continuity. These two lasers are not especially difficult to construct in a medium sized laboratory. At the same time, their dimensions are large, and this makes the whole opto-acoustical system of measurement clumsy and not mobile.

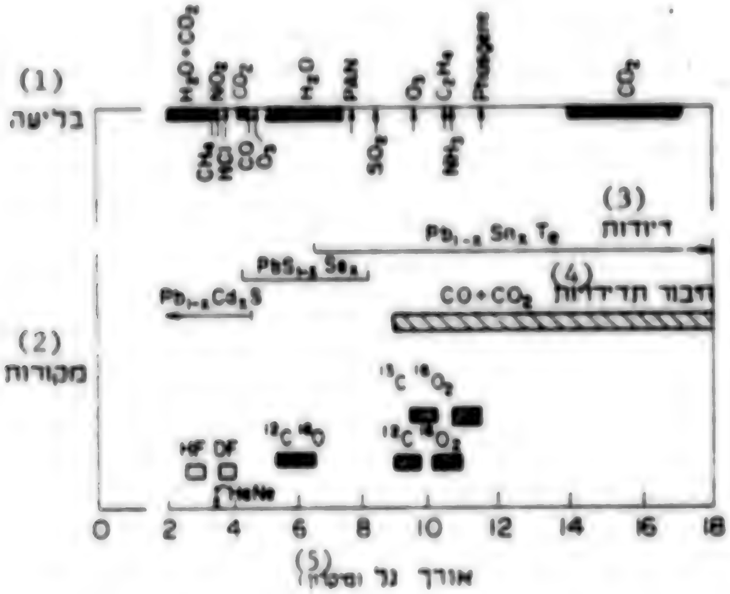

Figure 8: Below: wave length ranges produced by line directing lasers at infra-red. (partial list). Above: principal absorption lines of typical air pollutants.

Key:
(1) Absorption
(2) Sources
(3) Diodes
(4) Linking of frequencies
(5) Wave length (microns)

In Figure 4 is an example of opto-acoustical spectroscopy of the gas ethylene (C_2H4) by means of a CO_2 laser, and an example of the detection of ethylene in the air of a room at low concentration. There is great importance to the detection of ethylene because of the fact that it is an emission from car engines. Another importance of detecting low concentrations--50 parts per billion--is in agriculture, since it is a growth "hormone" and ripener of fruit, especially citrus fruit. The spectral discontinuity in measurement, shown in Figure 4, is prominent because of the sharp jumps of measurement results in moving from one wave length to a second. In the particular case shown in the figure, it was possible to identify ethylene in the room air by using a rather limited number of spectral lines, because of the strong absorption of the gas at wave length 10.532 microns. This would not be so in most other cases. The most characteristic spectrum of gases is the spectrum of this example of acetophenone, given in the lower part of Figure 4.

For purposes of identifying a gas in a mixture by means of a laser having a wave length adjustment rod, it is generally necessary to make a series of measurements corresponding in number to the number of pollutants in the mixture. Each measurement is made at a different wave length. The concentrations of gases in the mixture are calculated laser, by a system of equations, in which the invariables are the coefficients of absorption of the components of the mixture.

In contrast to lasers having a rod spectral emission, it is possible to operate lasers which have a continuous spectral adjustment. Included among these lasers are CO_2 lasers of the wave within type, diode lasers, as well as lasers of the Spin Flip Raman type. The advantage of the continuous spectral adjustment of the laser is that it is possible to identify a gaseous component of a mixture by rapid adjustment of the laser within a narrow spectral band, which encompasses the absorption line area of the air pollutant being tested. The rest of the components of the mixture will have a fixed absorption factor in such a narrow spectral area, and so they will not contribute to a change in the opto-acoustical sign because of a change in the wave length of the laser.

In Figure 9 is shown an example for the measurement of Nitrogen oxide (NO) in the stratosphere, by means of the Spin Flip Raman laser and an opto-acoustical chamber. The measurement was conducted by patel and his aides at the Bell Laboratories in the United States. The gas NO has a destructive effect on the ozone, O_3, which is in the stratosphere, and acts as a shield for us against the ultra-violet radiation of the sun. The source of the gas NO is principally the gas NO_2 which breaks down under the effect of ultra-violet radiation. Therefore, the concentration of NO increases after sunrise, and is reduced after sunset. The gas NO_2, on its part, is the product of combustion in plane engines.

The measurement by patel shown in Figure 9 was conducted by means of an opto-acoustical system which was carried by a balloon to a height of 28 kilometers. It enabled the measurement of the molecular density of NO at a rate of 10^8 molecules per cm^3 (for comparison--the number of molecules of air in a cubic centimeter at atmospheric pressure and a temperature of 300° Kelvin is about 10^{-19}). The width of the full spectral area used by patel was substantially

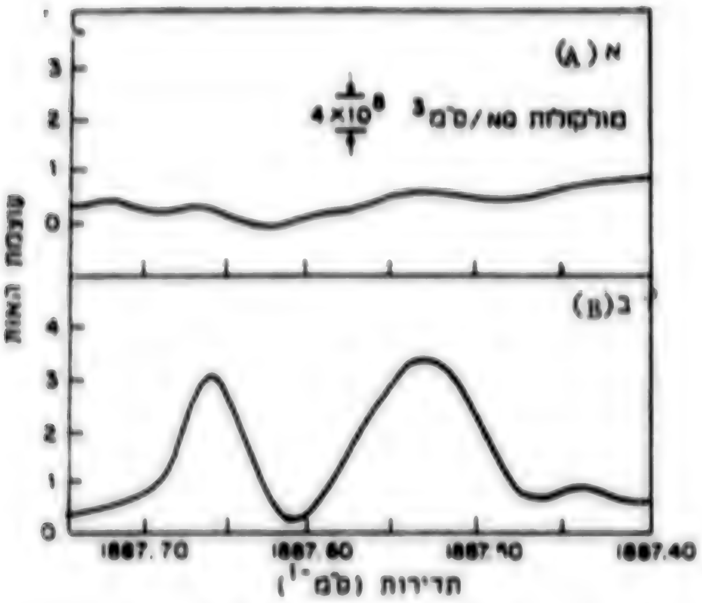

Figure 9. The measurement of the concentration of NO gas in the stratosphere by means of an opto-acoustical chamber and a laser capable of changing the wave length which it projects continuously. The measurement was carried out by means of a balloon at an altitude of 28 kilometers. Curves a. and b. give the opto-acoustical sign as a function of the projected wave length. A--the sign before sunrise. B--the sign after sunrise. The ultra-violet radiation broke down the NO_2 gas in the stratosphere, and increased the amount of NO which left its characteristic spectral mark by means of the two high points seen in the figure. The concentration of NO was 2×10^9 molecules per cc. Although the concentration of water vapor was high by twofold, it did not disturb the measurement because its absorption was uniform in the spectral range in which the measurement was executed.

smaller than the distance between the two emission lines of the CO_2 laser. Note that in the absence of NO, various molecular components of the stratosphere--including water vapor, as measured by patel in the same experiment--contributed an opto-acoustical sign not dependent upon the wave length (Figure 9a). Only the NO, which appeared after the sunrise, left its characteristic spectral mark on the measurement.

We have brought two examples of spectroscopy in infra-red and the detection of air pollutants at a low concentration, by means of the opto-acoustical effect. A list of examples could be longer and include, inter alia, an examination of the composition of the emission products of automobile engines, of the products of chemical reactions, measurement of the transparency of the atmosphere at various wave lengths in infra-red, and more. There recently appeared on the market a commercial opto-acoustical detector based on a CO_2 laser.

Library of Absorption Factors

Will the opto-acoustical method of measurement replace the accepted methods of measuring air pollution today? Will the spectrophone, based on the laser as a light source, become the ordinary spectrometer, at infra-red for gases in the chemist's laboratory? The answer to these questions depends upon two principal factors:

a) Additional development of directing line lasers at infra-red, and the achievement of a broader range of continual adjustment by means of a single laser. Today, a number of lasers are required to carry out spectroscopy at infra-red in the spectral range exceeding a few microns (as is seen in Figure 8). Moreover, there must be a substantial reduction in the price of lasers, and a reduction in the clumsiness of the equipment to operate them.

b) The building of "libraries" of absorption factors of a large number of gases. One of the practical limitations of the opto-acoustical method of measurement lies in the fact that at all wave lengths many air pollutants found in the atmosphere contribute to the opto-acoustical sign. It is impossible to indicate at every wave length a certain pollutant as the single contributor of a sign. Precise knowledge of the absorption factors of all possible atmospheric components would enable the detection of their concentration by the solution of an appropriate system of equations, arrived at by the end of a series of measurements at various wave lengths.

Technically, the finding of a solution is simple, through the use of a microcomputer. But surprisingly, today, the absorption factors of fairly common gases (e.g. H_2O and CO_2) are known with a precision that does not exceed an error of 5 percent. In many cases the reason for this is very weak absorption factors which are difficult to measure, as well as the difficulties in preparing pure gas samples. In fact, today sensitive opto-acoustical systems are being used to prepare precise libraries of molecular absorption factors of gases so as to make possible in the future the use of opto-acoustical systems as systems to detect air pollutants at low concentrations. In the present state of knowledge of the absorption factors of many components of the atmosphere, the opto-acoustical method of measurement is limited to concentration which exceed a few parts per billion.

What Does Water Absorb?

We will close by mentioning another important development--the opto-acoustics of fluids and solids. The opto-acoustics of fluids is a process of development of a pressure sign in a fluid as a result of the absorption of light rays by the fluid or by a pollutant in the fluid, and its heating up. The modern development of the technique by Tam and patel immediately produced an impressive result: the measurement of the absorption factors of pure water in the area of visible light. These absorption factors were only measured for the first time in 1979! The precise measurement of the absorption factors of pure water of visible light were not previously possible because of the high transparency of water. Measurement of the absorption factors by examining the passage of light requires passage of the beam through water causes of a few kilometers. Water which is pure over such a great distance is not to be found.

The opto-acoustical effect in solids is more complicated. By one method, a thin layer of a solid is heated (e.g. dust where the goal is to measure its spectrum absorption) by means of a periodic light source. The material is contained within a small opto-acoustical chamber filled with air. The heat measured for absorption is transferred from the solid to the air. The pressure sign which accompanies this process is measured by means of a microphone. By a more perfected method, the solid is put under pressure (again, generally dust) between two transparent thin phasoelectric panels, in the form of a sandwich. The heating of the solid, which is subjected to the light beam, causes its dispersal, and as a result of the mechanical contact between it and the phasoelectric panels, a voltage sign is created at the edges of the panels. The dependence of the power of this sign on the wave length of the periodic light source gives the spectrum absorption of the dust. The most modern and perhaps most important development in the opto-acoustical field for solids is the opto-acoustical microscope. This field is only now in its infancy, and there are those who predict many great things for it.

We have seen how the effect which was discovered a century ago--the opto-acoustical effect--combined with modern optical technology--the laser technology--has in the last decade become a sensitive method for measuring the weakest absorptions at infra-red. The application of the method in so important an area in an era of increased industrialization--the measurement of air pollution at low concentrations--has increased interest in opto-acoustics and has accelerated development of the spectrophone, based on lasers as the light sources.

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LACK OF DEVELOPMENT HURTS NEGEV ENVIRONMENT

Jerusalem THE JERUSALEM POST in English 5 Apr 81 p 3

[Article by Aryeh Wolman]

[Text]

The Negev is becoming the country's dumping ground for polluting factories, industrial waste, dangerous military bases, nuclear power stations — and undesirable population, social scientists claimed at a 10-day seminar on the region which ended yesterday.

Prof. David Stea of the University of California at Los Angeles warned that the Negev could meet a fate similar to that of the south-western desert in the U.S. The "national sacrifice area," he said, had been set aside there at the expense of the indigenous Indian population, which he compared with the Beduin.

Prof. Aryeh Shachar, director of the Institute of Urban and Regional Studies at the Hebrew University, said: "It is the erroneous popular perception of the Negev as an empty space and a useless resource that is increasing the danger of it becoming the dumping ground of Israel."

Several lecturers from Ben-Gurion University in Beersheba objected to the IDF's re-deployment plans in the Negev and the lack of civilian control over them. Only two civilians sit on the committee responsible for the re-deployment, and when the university offered to undertake research in several areas of mutual interest affected by the re-deployment, the IDF failed to respond, the lecturers claimed.

Yehuda Gradus, lecturer in geography at Ben-Gurion University, said that if the Negev were to declare itself an independent state, the standard of living of its inhabitants would be much higher, because of the region's natural resources. Export earnings from Negev minerals, mainly potash and phosphates, amounted to $500m. annually, he said. "The trouble is that the money is taken and spent in the centre of the country for the benefit of the people there," he claimed.

The region consistently had only three or four Knesset representatives, he said, even though its population justified 10 to 12.

He added that there had been an upsurge in regional consciousness in recent years as evidenced by the popularity of local newspapers and the rising number of questions asked in the Knesset on regional issues.

Other participants thought regional identity was "an artificial concept existing mainly in the minds of planners." Fred Lazin of Ben-Gurion University said that his field work in Yeroham suggested that young voters identified themselves primarily in ethnic terms and showed no regional consciousness.

Uri Regev, a Ben-Gurion University economist, said the development of the Negev had been neglected in the 1970s for three reasons. With the conquest of Sinai, it no longer seemed strategically vulnerable; its population had passed a certain critical figure which allowed most important services to be supplied; and the government believed there were more pressing demographic problems in the Galilee and the administered territories.

Prof Peter Marris, head of the Urban Planning Department at UCLA, warned that the economy of the Negev was growing increasingly vulnerable as it had become dependent on the export of products whose prices fluctuate greatly on world markets. These included minerals and out-of-season vegetables and fruits.

The seminar was primarily for faculty members of Ben-Gurion University and UCLA and was held to promote cooperation between the two institutions.

Some of the U.S. professors suggested that Ben-Gurion University may have sacrificed some of its academic integrity by becoming too deeply involved in the daily problems of the region.

"There seems to be too much willingness to accept the problems of the region as others define them," said Prof Martin Wachs, an urban planner.

CSO: 5000

BRIEFS

CONSERVATION SEMINAR--A four-day seminar on the Southern African Regional Commission for the Conservation and Utilisation of the Soil was scheduled to wind up yesterday. Six southern African countries were represented in the conference which was officially opened by the Minister for Agriculture, Mr. A.K. Hlophe on Monday. [Text] [Mbabane THE TIMES OF SWAZILAND in English 1 May 81 p 1]

CSO: 5000/5012

BRIEFS

BORNO STATE DESERTIFICATION PROGRAM--Governor Muhammed Goni of Borno State has appealed to the Federal Government to establish a permanent Anti-desertification Commission to handle the problem of desert encroachment in some parts of the country. The Governor said that desert encroachment was one of the most serious natural problems facing his state. He said that desertification had reduced cultivatable land in the area and that insufficient rain resulted in low crop yields or crop destruction. He said that his government had financed an anti-desertification scheme to minimise the problems of desert encroachment in the State. Governor Goni re-affirmed his administrations commitment to the programmes of the national committee on arid zone afforestation, adding that the people of the state would be educated on the value of trees in preventing desert encroachment. The Presidential Special Adviser on Statutory Boards, Dr. Olufemi Olaifa, has visited Borno State to assess the effects of the drought. [Text] [London WEST AFRICA in English 20 Apr 81 p 898]

CSO: 5000/5010

EXTENSIVE REDEVELOPMENT PLAN FOR ATHENS ANNOUNCED

Athens THE ATHENIAN in English May 81 p 13

[Text]

ON April 13 the Minister of Planning and Environment George Plytas revealed the most extensive redevelopment plan in recent times for the areas surrounding antiquities of central Athens. The seven billion drachma project covering 275 acres will create a continuous, semicircular green belt stretching from the National Gardens to the Keramikos Cemetery, a distance of over three kilometers.

The virtues of the plan are manifold: it will mean demolishing no important landmark, ancient or neoclassical; it will redirect through traffic efficiently; and it will allow scope for extensive development of urban landscaping. The major asset of the plan, however, is that it will integrate the ancient monuments and the paths and gardens around them which have been created in the past into a single, organic and continuous whole.

Until now most of the classical sites of Athens have existed in semi-isolation made more so by the steady increase of traffic along the avenues that divide them.

For example, Ardittos Hill into which the Stadium is cut, has been, in effect, closed to the public for years; the large area around the Temple of Olympian Zeus is rarely frequented because there is hardly any point where the avenues surrounding it can be safely crossed; and the ancient cemetery of Keramikos is cut off from the Agora and the Thesion area to which it archaeologically belongs by railroad tracks. Even the Acropolis appears today to be more like an island or an oasis in the center of the city rather than a major urban focal point.

Work on this extensive project will begin in September with the creation of a new and spacious square bridging the tracks in front of the Keramikos Cemetery, an area which will be greatly expanded to include the property of the city Gas Works whose installations (a major factor in pollution) are being moved to Aspropyrgos. In the Olympeion area, a series of pedestrian underpasses, overpasses and a 450-meter tunnel under part of what is now Syngrou and Queen Amalias Avenues will integrate the archaeological sites to the east. Finally, in the central area, with the completion of a walkway around the Acropolis (already under construction), the transformation of Dionysiou Areopagitou into a pedestrian way, the incorporation of the Makriyannis Barracks area with that part of the Plaka leading to Hadrian's Arch, the aims of the scheme will be fundamentally achieved. At the same time, a series of garages and parking lots for pullman buses has been worked into the plan, set strategically but at some distance from the Acropolis. And, finally, the funnelling off of through traffic by widening avenues south of Philoppapou and the Hill of the Nymphs, will largely help solve the practical considerations.

While long overdue, the plan is anything but a Utopian one fated to remain forever on a city planner's drawing board. The basic merit of the whole conception is that – while costly – it is economically and practically feasible and it should give this city, now suffering a crisis in confidence, new grounds for hope.

CSO: 5000

INSTITUTE STUDY: WATER PURIFICATION IS UNSATISFACTORY

Oslo AFTENPOSTEN in Norwegian 31 Dec 80 p 4

[Text] A study which the Norwegian Institute of Water Research (NIVA) has carried out on the installations responsible for the treatment of drinking water at 21 of the country's waterworks shows that none of them was functioning as expected. Random checks indicated also that none of these installations could supply water to meet the stringent standards which the State Institute of Public Health sets for drinking water.

Generally the reason for this poor standard of water supply falls on a low priority. We have too long believed that pure water can be taken for granted. The more direct causes for this at the installations are the wrong choices of water purification systems, incorrect capacities, bad labor relations, lack of management training, poor planning and organization of operations.

The study has been going on for one year with Torbjorn Damhaug as project manager. This is an internal NIVA project, the goal of which primarily was to gain a better understanding of the existing relationships between Norwegian water systems. This is in order to link new research projects to the current Norwegian problems and to be able to make a practical effort to solve the problems that are found. The results also will be an important help in planning new waterworks.

The 21 waterworks which were studied are distributed throughout the country, from Vennesla in the south to Kirkenes in the north. The researchers presume that the study will give a realistic picture of the overall situation of the country. In the choice of waterworks in the future, comprehensive water treatment probably will be taken into account with closer attention than today. They studied nine different categories of purification systems from simple filtration to complete purification.

The authorities make a number of demands on drinking water. Among other things the water must have a low content of particles and bacteria and must be free of a conspicuous odor and taste, have little color, and must contain enough oxygen so that it has a fresh taste. All of the waterworks under study were deficient on one or more points. The researchers found that the adjustment for acidity was either lacking or functioned unsatisfactorily at all installations, it was necessary to remove iron at 10 waterworks, and of 6 plants where it was a question of taking out manganese, only one was equipped for the purpose.

Out of eight installations which were to reduce the iron content only half worked as expected. The one plant for removal of manganese passed through a concentration of the metal seven times higher than anticipated. Of the 3 works that utilized filtration alone, 2 of the filters were stopped up so that the water could not be filtered at all. The application of chemicals took place more or less sporadically.

The report resulting from the study stresses that there is much to be rectified, and regarding the working environment, waterworks have a low priority. The investigators put the finger on conditions such as the high noise level in plants and insufficient protective equipment. Few waterworks have separate lounges and control rooms, and cloackrooms, washrooms and toilets were generally lacking. Many larger installations have no telephone. There is also limited access to facilities for lifting heavy weights.

In connection with the study NIVA also learned that the price of drinking water varies from 2 ore to 127 ore per cubic meter.

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